FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

All sections must be addressed, or the application will be considered invalid

I. APPLICANT INFORMATION

A. Applicant Name: Big Hole Watershed Committee

Mailing Address: P.O. Box 21

City: Divide State: MT Zip: 59727

Telephone: 406-960-4855 E-mail: info@bhwc.org

B. Contact Person (if different than applicant): Pedro Marques, Executive Director

Address:

City: State: Zip:

Telephone: 406-552-2369 E-mail: pmarques@bhwc.org

C. Landowner and/or Lessee Name (if different than applicant): Montana Fish, Wildlife and Parks – Mount Haggin WMA
Attn: Vanna Boccadori, WMA Manager

Mailing Address: 1820 Meadowlark Lane

City: Butte State: MT Zip: 59701

Telephone: 406-494-1953 E-mail: vboccadori@fwp.gov

II. PROJECT INFORMATION

A. Project Name: French Creek Sediment Load Reduction

River, stream, or lake: French Creek

Location: Township: 2N Range: 12W Section: 1

Latitude: 45.94653 Longitude: -113.07099 *within project (decimal degrees)*

County: Deer Lodge

B. Purpose of Project:

To provide a long-term sediment reduction solution for French Creek. This project has procured a construction contractor and is near shovel-ready.

EA & Dike report ONLINE French Creek channel reconstruction

C. Brief Project Description (attach additional information to end of application):

Goals & Objectives:
• Reduce fine sediment loads in French Creek and Big Hole River.
• Restore French Creek where impacted by past mining & logging operations.
• Improve native fish and aquatics habitat.
• Reconnect floodplain & wetlands to surface water in lower French Creek.
• Restore public lands.
• Increase overbank deposition and groundwater recharge for late season base-flow.

The French Creek drainage, located on the Mount Haggin Wildlife Management Area (WMA), was heavily placer mined for gold and logged for nearly a century, beginning in the 1860s. Its soils and waters were also contaminated by fallout emissions from nearby smelters. The French Creek drainage has been a priority area for watershed restoration to the Big Hole Watershed Committee (BHWC) as well as several State & Federal agencies and NGOs for the last five years due to the extensive damages caused to steep slope vegetation, stream form and function, and riparian health. Several projects have already been completed or are currently in progress in this area, and the entire French Creek drainage is slated for native fish restoration by Montana Fish, Wildlife and Parks. The proposed French Creek Sediment Reduction project will contribute substantial habitat improvements to the overall goals of native fish restoration in this watershed.

The proposed project will address mining-related damages to French Creek, which has been pinned against a high eroding bank by an unnatural dike feature, causing annual deposition of an estimated 800+ tons of sediment per year, affecting downstream fish and mussel habitat (see images in attachments where linear sagebrush vegetation marks dike location). Our restoration approach for this project is to replicate reference conditions in this reach by constructing an unconfined stream channel east of the channel's current location, connecting the unconfined reaches above and below the project area. Approximately 4000' of lineal feet of new stream channel will be constructed in the floodplain away from the hillslope. The new stream channel will be located in an area of healthy riparian vegetation. Native sods and existing willows and willow transplants will be used to construct the banks of the new stream channel. Bioengineered meander bends will also be used where native vegetation may be lacking to both temporarily ensure stability until vegetation is re-established and to create complex cover habitats. The existing floodplain and wetland vegetation in the restoration area will be incorporated into the design to provide cost effective and robust vegetation restoration. By placing new channel in degraded upland areas, and work on abandoned channel will establish new wetlands that will provide ecosystem benefits locally and also serve to mitigate for lost wetlands from the French Creek fish barrier project.

The project currently has secured funding from Montana DEQ that cover all coordination, monitoring, education/outreach, design, permitting, bidding and oversight costs, as well as some construction costs and mobilization ($240,000). Assessment and design has been completed and initial design drawings and cost estimates are provided. BHWC and FWP are prepared to adjust project design details and construction costs with engineer to match available funding. Our target funding for the project is shown in the Match side of the budget sheet, while the engineers initial estimate is shown on the left side of the sheet. Project savings could be found by decreasing the among of bioengineering on banks and relying more on willows and sods. Funding from the Future Fisheries program would be used for the construction of the new channel. More details provided in the budget attachment. Other sources of funding- George Grant Trout Unlimited ($5,000), Montana Trout Unlimited ($5,000) have been secured and additional funding from The Nature Conservancy ($47,000) has been verbally but not officially committed. Additional savings will be found by contracting this project with our Oregon Creek project upstream, saving on mobilization and bonding costs.

Once Arctic grayling and Westslope Cutthroat trout are restored, French Creek will represent the second largest interconnected stream system (over 40 miles of stream) in the upper Missouri River drainage with a native fish community. This project may also contribute to the restoration of Western Pearlshell mussels to French Creek once water quality and aquatic and riparian habitat have improved.

(RESPONSE IN LARGER FONT AFTER SIGNATURE PAGE)

D. Length of stream or size of lake that will be treated: 4000ft

E. Project Budget:

Grant Request (Dollars):	**$**	79,932.00
Matching Dollars:	**$**	204,521.00
Matching In-Kind Services:*	**$**	18,500.00

**salaries of government employees are not considered matching contributions*

Total Project Cost: **$** 592,662.00

F. **Attach** itemized (line item) budget – *see budget template*

G. **Attach** specific project plans, detailed sketches, plan views, photographs, maps, evidence of landowner consent, evidence of public support and fish biologist support, and/or other information necessary to evaluate the merits of the project. If project involves water leasing or water salvage complete a *supplemental questionnaire*. (http://fwp.mt.gov/fwpDoc.html?id=36110)

H. **Attach** land management & maintenance plans that will ensure protection of the reclaimed area.

III. PROJECT BENEFITS (attach additional information to end of application):

A. What species of fish will benefit from this project?

Westslope cutthroat trout and Arctic grayling

B. How will the project protect or enhance wild fish habitat?

The project will enhance fish habitat on 4,000 feet of channel by significantly reducing a major sediment source to the channel. Spawning substrate within and far downstream of the project reach will benefit from the relocation of the channel away from the high terrace. Channel design and bioengineered streambanks will create more diverse habitat in the channel with the use of rootwads and mature transplants and construction of pools and riffles.

C. Will the project improve fish populations and/or fishing? To what extent?

The project will improve water quality and fish habitat by reducing stream sedimentation. Project will improve quality and quantity of spawning habitat and habitat diversity conditions beyond the 2700 feet of channel of active construction. These improvements should increase fish populations. Reduced water temperature from active floodplain function and increased late season flows will benefit fish in both the French Creek drainage and the Big Hole River.

This project is part of a suite of projects on public land in the Mt. Haggin Wildlife Management Area. With the implementation of the fish barrier downstream and introduction of native fish species to 40 miles of headwater tributaries upstream, the fishery in this region could become oneof-a-kind. The fishing locally and in the Big Hole River downstream would benefit from a stronghold of pure native cutthroat and grayling in the French Creek watershed. There are also potential benefits for pearlshell mussel.

D. Will the project increase public fishing opportunity for wild fish and, if so, how?

Yes, the project is located entirely on public land. The public will have the opportunity to fish for native species (Arctic grayling and Westslope cutthroat trout) in a system without nonnative fish upon completion of the barrier project. The improved habitat conditions and decreased sedimentation of French Creek will improve availability of spawning substrate and suitable habitat diversity for the native species.

E. The project agreement includes a 20-year maintenance commitment. Please discuss your ability to meet this commitment.

Montana Fish, Wildlife and Parks manages this land and has dedicated personnel to the WMA for the foreseeable future. The Big Hole Watershed Committee is committed to supporting MFWP as necessary and provided funding.

F. What was the cause of habitat degradation in the area of this project and how will the project correct the cause?

This area was the location of the first gold strike in the Big Hole watershed in the 1860s, resulting in extensive placer mining as well as logging to feed the nearby Washoe smelter. Linear gravel features, clearly the result of this mining history, run through French Creek's floodplain, confining the channel against a high eroding bank (terrace). These gravel piles act as a dike, limiting proper stream function and forcing the channel into an erosive bank. Preliminary estimates (BEHI method) show over 800 tons/year of sediment contributed to French Creek.

This project will eliminate this large sediment source by constructing 4000 feet of new channel with only natural amounts of annual streambank erosion and improve water quality by reducing sediment loading. Natural channel function and riparian vegetation will be restored along 4000 feet of channel, with benefits for native fish and other species of concern. Abandoned channel will be restored to a depressional feature.

G. What public benefits will be realized from this project?

The intact system will provide benefits to fish & wildlife, recreation, and the floodplain, as well as to the water supply of Butte, which sources 40% of its water from the Big Hole River (French Creek<Deep Creek<Big Hole River).

Fish & Wildlife: Westslope cutthroat trout and Arctic grayling are slated to be restored to the French Creek drainage. Both Species are species of Concern in Montana and have been petitioned for listing under the Endangered Species Act. Large scale restoration projects such as the French Creek watershed project will aid in conserving these species and lessen the chances that they will warrant listing as a Threatened or Endangered Species. Preventing the listing of these species will benefit all Montanans, particularly private landowners in the Big Hole.

Woody debris rootwads, channel bed shaping and mature transplants and sod mats will immediately improve fish and wildlife habitat in the project reach. After several seasons of overbank stream events in the new channel, floodplain and riparian habitat will be substantially improved. Wildlife habitat will also improve as a result of the restoration of the riparian area, with benefits multiple game species such as moose, elk, deer, and bear as well as non-game species such as Sandhill crane, beaver.

Recreation: Opportunities for Montanans to observe, and in some cases harvest, wildlife species will be increased through the restoration of French Creek. Upon completion, this project will provide anglers the unique opportunity to fish for native species in a healthy, functioning stream system that excludes nonnative fish species.

Floodplain: This project will benefit French Creek's floodplain by creating 2700' of new channel with a hydrologically active floodplain. Almost 20 acres of floodplain is not currently mapped as riparian. These acres will become active parts of the floodplain post construction and likely convert to wetland.

(RESPONSE IN LARGER FONT AFTER SIGNATURE PAGE)

H. Will the project interfere with water or property rights of adjacent landowners? (explain):

No, the project is located entirely on public property (FWP Mount Haggin Wildlife Management Area).

I. Will the project result in the development of commercial recreational use on the site? (explain):

No.

J. Is this project associated with the reclamation of past mining activity?

The dike and earthwork that created the impairment was likely related to mining activity in the watershed beginning in 1863. While the actual impairment is sediment from the high terrace, the location of the channel and restriction of the floodplain is related to mining activity.

Each approved project applicant must enter into a written agreement with Montana Fish, Wildlife & Parks specifying terms and duration of the project. The applicant must obtain all applicable permits prior to project construction. A competitive bid process must be followed when using State funds.

IV. AUTHORIZING STATEMENT

I (we) hereby declare that the information and all statements to this application are true, complete, and accurate to the best of my (our) knowledge and that the project or activity complies with rules of the Future Fisheries Improvement Program.

Applicant Signature: _____ Date: 05/30/2019

Sponsor (if applicable): _____

Submittal: **Applications must be *signed and received before* December 1 and June 1 of each year to be considered for the subsequent funding period**. Late or incomplete applications will be rejected.

Mail to:	Montana FWP Fish Management Bureau PO Box 200701 Helena, MT 59620-0701	Email:	Michelle McGree mmcgree@mt.gov (electronic submissions must be signed) For files over 10MB, use https://transfer.mt.gov

Applications may be rejected if this form is modified.

RESPONSE II C. PROJECT DESCRIPTION

Goals & Objectives:

- Reduce fine sediment loads in French Creek and Big Hole River.
- Restore French Creek where impacted by past mining & logging operations.
- Improve native fish and aquatics habitat.
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RESPONSE TO SECTION III G. WHAT PUBLIC BENEFITS WILL BE REALIZED FROM THIS PROJECT?

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Post Office Box 21
Divide, MT 59727
(406) 960-4855
info@bhwc.org

BIG HOLE
WATERSHED COMMITTEE
Conservation Through Consensus.

May 31, 2019

Michelle McGree
Montana Fish, Wildlife & Parks
Fisheries Division
PO Box 200701
Helena, MT 59620-0701

Dear Montana FWP,

Please accept the Big Hole Watershed Committee's submission of a Future Fisheries grant proposal. Our request supports the reduction of sediment inputs into French Creek on the Mount Haggin Wildlife Management Area in the Big Hole River watershed. These habitat improvements will be crucial for a larger fish introduction project.

An electronic version of these files were emailed to mmcgree@mt.gov via the State File Transfer Service.

Our Application includes:

- Future Fisheries Final Proposal Form PDF, signed
- Attachments:
  - Letters of Support
  - Big Hole River Watershed – Project Location
  - French Creek Project Files
    - Project Budget
    - Final Design Sheets
    - MFWP EA Decision Notice
    - Cultural Inventory- Dike report
    - Project Images
    - Recommendation to Contract

Thank you and MFWP staff for assisting us with this application and all our efforts in the Big Hole.

Sincerely,

Pedro Marques
Executive Director

French Creek channel reconstruction

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

Both tables must be completed or the application will be returned

WORK ITEMS (ITEMIZE BY CATEGORY)	NUMBER OF UNITS	UNIT DESCRIPTION*	COST/UNIT	TOTAL COST	CONTRIBUTIONS			
					FISHERIES REQUEST	IN-KIND SERVICES**	IN-KIND CASH	TOTAL
Personnel* **								
Survey	1	LS	$5,800.00	$5,800.00			5,800.00	$ 5,800.00
Design	1	LS	$29,200.00	$29,200.00			29,200.00	$ 29,200.00
Permitting + Delineation	1	LS	$10,500.00	$10,500.00			10,500.00	$ 10,500.00
Cultural Survey	1	LS	$4,651.00	$4,651.00			4,651.00	$ 4,651.00
Oversight+Staking	1	LS	$33,942.00	$33,942.00			33,942.00	$ 33,942.00
Wetland Seed	1	LS	$5,000.00	$5,000.00			5,000.00	$ 5,000.00
BHWC Admin	1	LS	$24,000.00	$24,000.00			24,000.00	$ 24,000.00
BHWC Monitoring	1	LS	$5,000.00	$5,000.00			5,000.00	$ 5,000.00
BHWC Outreach, Education	1	LS	$5,000.00	$5,000.00			5,000.00	$ 5,000.00
			Sub-Total	$123,093.00	$ -	$ -	$ 123,093.00	$ 123,093.00
Travel								
Mileage				$ -				$ -
Per diem				$ -				$ -
			Sub-Total	$ -	$ -	$ -	$ -	$ -
Construction Materials** **								
Taxes, Bonds, and Insurance	1	LS	$11,000.00	$11,000.00			11,000.00	$ 11,000.00
General Requirements	1	LS	$8,280.00	$8,280.00			8,280.00	$ 8,280.00
				$ -				$ -
			Sub-Total	$19,280.00	$ -	$ -	$ 19,280.00	$ 19,280.00
Equipment and Labor								
Water & Erosion Control	1	LS	$8,312.00	$8,312.00	$8,312.00		$0.00	$ 8,312.00
Earthwork	1	LS	$86,000.00	$86,000.00			$86,000.00	$ 86,000.00
Import Streambed Material	3000	CY	$7.60	$22,800.00	$22,800.00		$0.00	$ 22,800.00
Willow Streambanks	1150	LF	$22.30	$25,645.00			$25,645.00	$ 25,645.00
Point Bar Streambanks	2015	LF	$10.00	$20,150.00	$20,150.00		$0.00	$ 20,150.00
Woody Habitat Structure	16	EA	$786.00	$12,576.00			$12,576.00	$ 12,576.00
Abandoned Channel Plug	2	EA	$11,480.00	$22,960.00			$22,960.00	$ 22,960.00
Topsoil/Vegetation Salvaging & Stockpiling	1	LS	$57,340.00	$57,340.00			$57,340.00	$ 57,340.00
Revegetation	1	LS	$28,670.00	$28,670.00	$28,670.00		$0.00	$ 28,670.00
Root wad delivery	1	LS	$7,500.00	$7,500.00			$7,500.00	$ 7,500.00
FWP Habitat work- fish and barrier	1	LS	$11,000.00	$11,000.00			$11,000.00	$ 11,000.00
				$302,953.00	$79,932.00	$0.00	$223,021.00	$302,953.00

(Revised 5/30/2019)

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

Mobilization								
Mobilization/Demobilization	1	LS	$15,072.00	$15,072.00			$15,072.00	$15,072.00
				$ -				
Additional Wetland Area Creation								
9 areas	1	LS		$132,634.00			$126,264.00	$126,264.00
								$0.00
			TOTALS	$593,032.00	$79,932.00	$0.00	$506,730.00	$586,662.00

OTHER REQUIREMENTS:

All of the columns in the budget table and the matching contribution table MUST be completed appropriately or the application will be invalid. Please see the example budget sheet for additional clarification.

*Units = feet, hours, inches, etc. Do not use lump sum unless there is no other way to describe the costs.

**Can include in-kind materials. Justification for in-kind labor (e.g. hourly rates used for calculations). Describe here or in text.

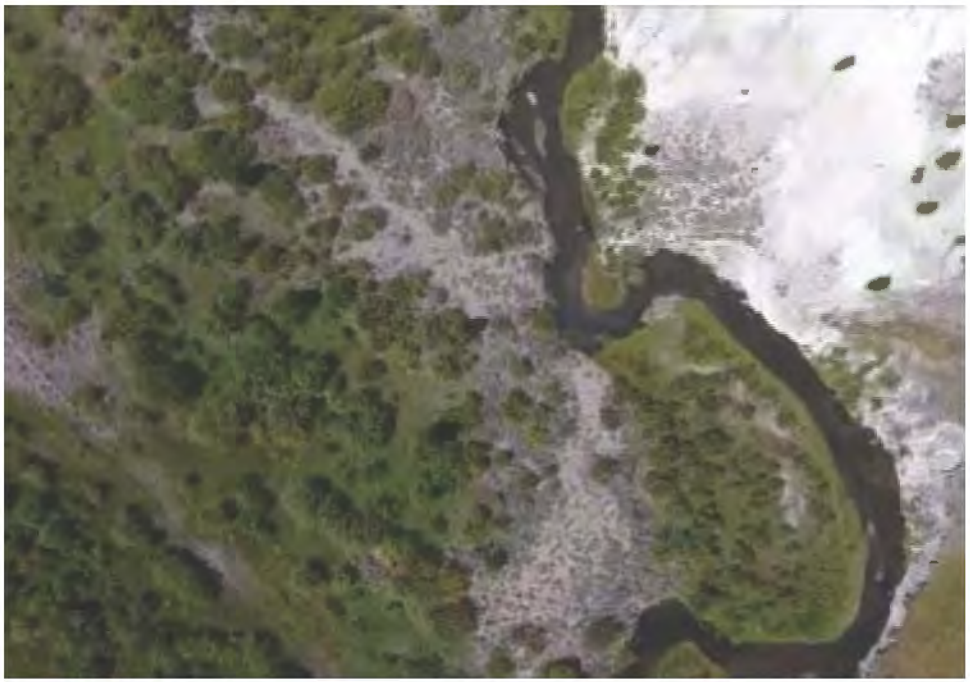
Reminder: Government salaries cannot be used as in-kind match

***The Review Panel suggests that design and oversight costs associated with a proposed project not exceed 15% of the total project budget. If design and oversight costs are in excess of 15%, applications must include a minimum of two competitive bids for the cost of undertaking the project.

****The Review Panel recommends a maximum fencing cost of $1.50 per foot. Additional costs may be the responsibility of the applicant and/or partners.

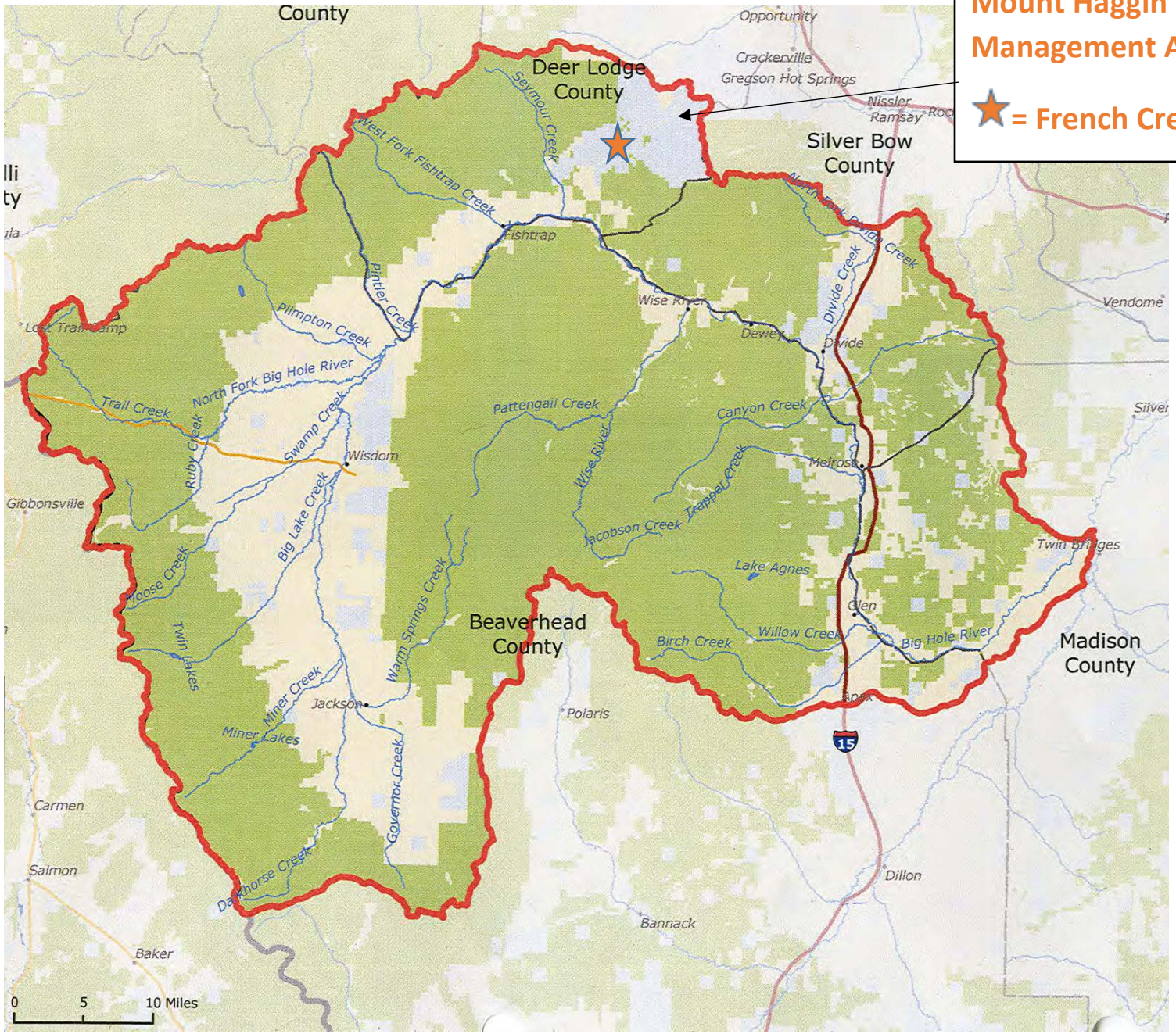
MATCHING CONTRIBUTIONS (do not include requested funds)

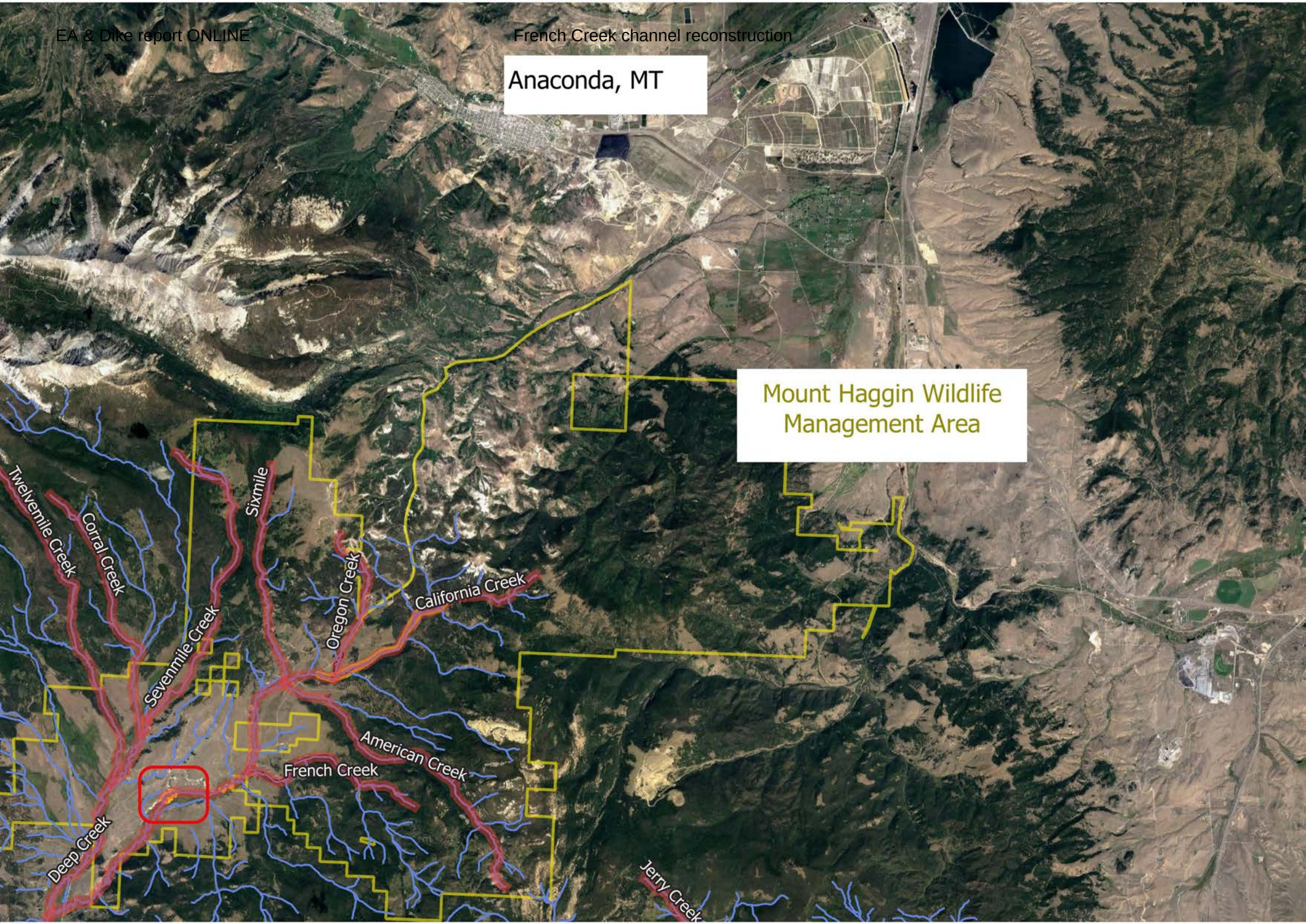
CONTRIBUTOR	IN-KIND SERVICE	IN-KIND CASH	TOTAL	Secured? (Y/N)
Montana DEQ	$ -	$ 240,000.00	$ 240,000.00	Yes
Montana DEQ Additional Funds	$ -	$ 45,000.00	$ 45,000.00	Yes
Montana Trout Unlimited	$ -	$ 5,000.00	$ 5,000.00	Yes
George Grant Trout Unlimited	$ -	$ 5,000.00	$ 5,000.00	Yes
The Nature Conservancy	$ -	$ 29,000.00	$ 29,000.00	No
Bureau of Reclamation	$ -	$ 86,610.00	$ 86,610.00	No
In-Kind (Montana FWP- landowner agreement, permitting, coordination and other habitat work)		$ 15,000.00	$ 15,000.00	Yes
In-kind BLM- donation of root wads		$ 7,500.00	$ 7,500.00	Yes
Wildlife Conservation Society		$ 56,570.00	$ 56,570.00	Yes
The Nature Conservancy- Gage equipment	$ -	$ 1,000.00	$ 1,000.00	Yes
	$ -	$ -	$ -	
TOTALS	$ -	$ 490,680.00	$ 490,680.00	

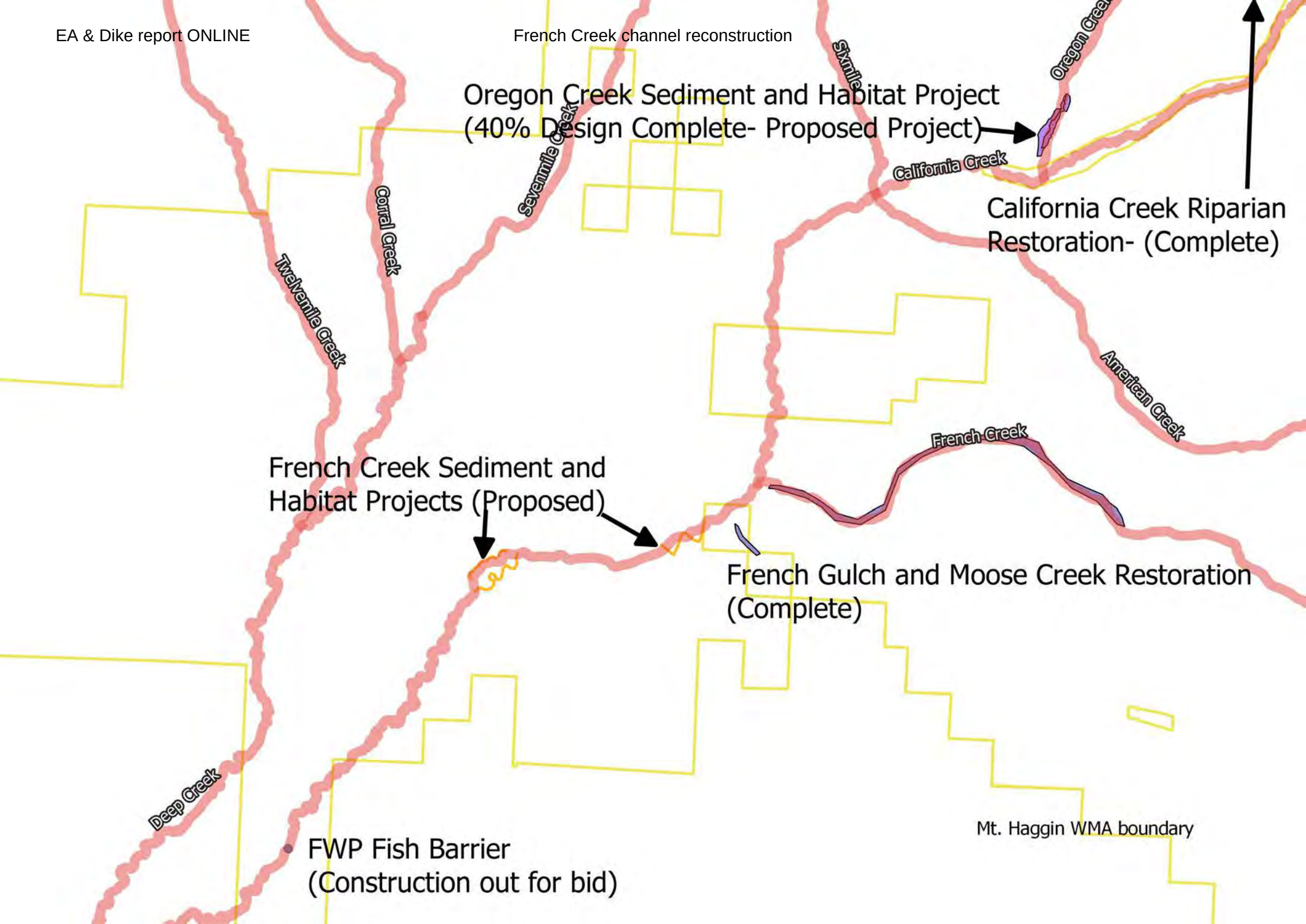


2018 Big Hole Watershed Committee FF Application – French Creek

Project Location – Big Hole River Watershed




EA & Dike report ONLINE
French Creek channel reconstruction
Anaconda, MT
Mount Haggin Wildlife Management Area
Twelvemile Creek
Corral Creek
Sixmile
Sevenmile Creek
Oregon Creek
California Creek
American Creek
French Creek
Deep Creek
Jerry Creek


Oregon Creek Sediment and Habitat Project
(40% Design Complete- Proposed Project)
California Creek Riparian
Restoration- (Complete)
French Creek Sediment and
Habitat Projects (Proposed)
French Gulch and Moose Creek Restoration
(Complete)
FWP Fish Barrier
(Construction out for bid)
Mt. Haggin WMA boundary
Sevenmile Creek
Corral Creek
Twelvemile Creek
California Creek
American Creek
French Creek
Deep Creek

Montana Fish, Wildlife & Parks
1820 Meadowlark Lane. Butte. MT 59701

May 30, 2018

FFIP Review panel

Dear Pannel,

I am writing this letter in support of the Big Hole Watershed Committee's application for funding to restore reaches of French Creek that are suffering from significant streambank erosion. Significant channel alteration occurred in this reach of stream in the early 1900's (prior to 1940) where the stream appears to have been channelized and directed toward a work area. Historical records are unclear on the type of work that went on at this area. The stream has abandoned this straightened channel is attempting to reestablish itself. This his causing massive bank erosion and sedimentation (see photo below). Further the stream flows along the base of large chalky bluffs and is constantly eroding the toe of these slopes causing material fall into the stream. The stream channel downstream of this reach is choked with fine sediments from this high erosion area.

The potential solution for reducing long-term erosion of the site is to relocate the stream channel to a section of the floodplain with a flourishing riparian area. This area has abundant willows and sedges and would be an excellent area to for channel establishment. The potential benefits of the project will be significant reduction in sediment entering French Creek. Also, there would likely be improvements in aquatic habitat because the large sediment loads are

filling pools and clogging gravels. Reduced sediment would benefit spawning fish, aquatic invertebrates and pearlshell mussels.

The French Creek drainage has been a priority area for watershed restoration in the Big Hole River drainage. Work is currently underway in the headwaters (California Creek) to improve water quality affected by atmospheric deposition from the Anaconda Smelter. French Gulch which was heavily impacted by placer mining was also restored in 2016. French Creek is also slated for native fish restoration including Arctic grayling and westslope cutthroat trout. Native salmonids are not as tolerant to habitat alterations and fine sediment loading as non-native brook trout. Once restored to a native fish population, French Creek will represent the second largest interconnected stream system (over 40 miles of stream) in the upper Missouri River drainage with a native fish community. The project will also result in advancing the goal of restoring westslope cutthroat trout to 400 miles of stream in the Big Hole Drainage (Statewide Fisheries Management Plan 2011). French Creek is also home to a native population of pearlshell mussels. Pearlshell mussels have been documented downstream of the project area, but their numbers are few. It is likely that the altered habitat conditions and fine sediment inputs from upstream reaches limits mussel populations in the area. It may be possible to restore pearlshell mussels to French Creek once water quality and aquatic and riparian habitat is improved.

The collaboration between FWP, the Big Hole Watershed Committee and other partners to improve the water quality and fisheries of French Creek and its tributaries represents a huge step in the right direction in this area. While substantial healing has occurred over the past 100 years, there are still significant problems that are causing degradation of water quality. Many of these problems can be fixed with proper restoration. Efforts such as those proposed in this application will make great strides in reducing fine sediment loading to French Creek. I would hope that FFIP funds this grant proposal because of the potential improvements to water quality and stream and floodplain function of the area.

Sincerely,

Jim Olsen
Fisheries Biologist
Montana Fish Wildlife and Parks

DEQ
Montana Department
of Environmental Quality

May 24, 2018

Montana Fish, Wildlife & Parks
Fisheries Division
PO Box 200701
Helena, MT 59620-0701

Dear Ms. McGree,

Please accept this letter of support for the Big Hole Watershed Committee's proposal to restore an altered section of French Creek. The Watershed Protection Section (WPS) at the Department of Environmental Quality (DEQ) administers Clean Water Act Section 319 funding to address nonpoint sources of pollution impairing the state's water quality. WPS has an annual call for proposals and review internally and by an inter-agency review panel. In 2017, WPS elected to fund this project on French Creek for $240,000 based on anticipated funding from the Environmental Protection Agency. Additional funding is necessary for the project to meet its proposed objectives and 319 match requirements.

French Creek is currently water quality impaired by excess fine sediment impacting aquatic life beneficial uses, including macroinvertebrates and native cold-water fish. Streambank erosion is a major source of sediment in French Creek and the TMDL requires a 36% reduction in anthropogenic causes of erosion to meet beneficial uses. This project will go a long way toward meeting target by addressing historical channel alterations that confine French Creek against a large eroding bank contributing tons of sediment annually. This project fits into a broad watershed approach to addressing sediment impairments from the headwaters downstream – including recent projects in California Creek, Moose Creek, and further upstream in French Creek. The Watershed Restoration Plan for the Middle-Lower Big Hole identifies French Creek as a priority for stream restoration. WPS encourages funding this proposal to improve water quality, promote natural stream functions, and restore a native fishery to this watershed.

Sincerely,

Dean Yashan, Section Supervisor
MDEQ, Watershed Protection Section
1520 E 6th Ave
Helena, MT 59601
Email: dyashan@mt.gov
(406) 444-5317

Phil Ralston
Ralston Ranch
54289 MT Hwy 43
Wise River, MT 59762
September 14, 2017

Montana Department of Environmental Quality
PO Box 200901
Helena, MT 59620

Dear Montana DEQ,

I would like to communicate my support for the Big Hole Watershed committee's project to restore French Creek through the 319 application process.

Ralston Ranch is my family's cattle ranch and it is the only operating ranch in the Deep Creek drainage. My family began ranching here in 1886. The ranch property is located at the lower end of Deep Creek, and on the Big Hole River near Deep Creek which includes two miles of Deep Creek frontage and 4 miles of Big Hole River frontage. Ralston Ranch borders both Mt. Haggin Wildlife Management Area, and US Forest Service. I have a grazing lease for cattle on the Mt. Haggin Wildlife Management Area.

I have been a board member and supporter of the Big Hole Watershed Committee since its inception in 1995. Ralston Ranch is enrolled in the Candidate Conservation Agreement with Assurances (CCAA) program for restoration of arctic grayling. I welcomed the first restoration project completed under the CCAA program in 1998.

The entire upper drainage affected by the Anaconda Smelter fallout have long been a problem and its repair is of interest to me. The sediment wash from California Creek that enters the stream is very fine. In a heavy rain event white sediment from California Creek uplands enters the stream and washes down through Deep Creek and enters the Big Hole River. This sediment stays suspended in the river for miles. When placer mining was active in the entire drainage, similar white sediment washed downstream turning the water white. French Creek gulch and First Chance gulch were part of this placer mining, seasonally until the mid 1950's.

The Big Hole Watershed Committee has tried to bring attention to the significant impairments on Mt. Haggin since 2000. Working with Montana Fish, Wildlife and Parks and others to repair California Creek and the hillsides, French Gulch and Moose Creek have already made noticeable improvements to the land and water. I have seen a significant improvement in the water quality in lower Deep Creek in the last twenty years, and in the last couple of years there has been no evidence of the white, chalky water flowing by the ranch.

I urge Montana DEQ to support the Big Hole Watershed Committee's request to support the French Creek's repair. Its location at the headwaters of the Deep Creek drainage makes this a critical piece to watershed health and quality.

Sincerely,

Phil Ralston

ANACONDA-DEER LODGE COUNTY
PLANNING DEPARTMENT
800 South Main
Anaconda, Montana 59711
Phone No. (406) 563-4010
Fax No. (406) 563-4076

September 18, 2017

Montana Department of Environmental Quality
Non-Point Source 319 Funding
PO Box 200901
Helena, Montana 59620

Dear Montana DEQ,

Anaconda-Deer Lodge County (ADLC) would like to pledge its support for stream restoration work on French Creek in the Mount Haggin Wildlife Management Area. We support the partnership and efforts of Montana Fish, Wildlife and Parks and the Big Hole Watershed Committee to complete this work. We strongly encourage the non-point source 319 program to fund the proposed work.

The French Creek portion of work will build upon successful restoration upstream in French Gulch, Moose Creek, and California Creek all of which now have rebuilt natural streams, connected floodplains, increased natural water storage, reduced sediment loads, and improved fish and wildlife habitat. The proposed French Creek work will continue to support a transformation on the state owned land from historic damage of Anaconda Company Smelter operations to a thriving ecosystem.

ADLC has had an opportunity to review the work recently completed in the French Gulch-Moose Creek drainages. We are very impressed by the results and encouraged that restoration of these watersheds can be accomplished as rapidly and cost-effectively as already demonstrated. 319 funding is a key factor in this success and we encourage continued support of these restoration efforts by MDEQ through this grant program.

As you may be aware, USEPA Region 8 is proposing a waiver/relaxation of state water quality standards for a number of high elevation watersheds in the County due to the "technical infeasibility" of implementing effective best management practices in these mountainous areas. The success of work performed in the French Gulch and Moose Creek drainages by the Big Hole Watershed Committee and its partners clearly demonstrates otherwise. Again, we strongly support continued funding of these restoration activities.

Respectfully,

Chas Ariss, PE
Public Works-Planning Director-County Engineer
Anaconda-Deer Lodge County

George Grant TU
PO Box 563
Butte, MT 59703

Cold Clean Fishable Water

Montana Department of Environmental Quality
Non-Point Source 319 Funding
PO Box 200901
Helena, Montana 59620

Dear Montana DEQ,
The George Grant Chapter of Trout Unlimited (GGTU) would like to pledge our support for stream restoration work on French Creek on the Mount Haggin Wildlife Management Area. We support the partnership and efforts of Montana Fish, Wildlife and Parks and the Big Hole Watershed Committee to complete this work and we encourage the non-point source 319 program to fund the proposed work.

The French Creek portion of work will build upon successful restoration upstream in French Gulch, Moose Creek, and California Creek all of which have rebuilt natural streams, connected floodplains, increased natural water storage, reduced sediment loads, and improved fish and wildlife habitat. The proposed French Creek work will continue to support a transformation on the state owned land from historic damage to a thriving ecosystem.

Projects like this and specifically this project fits perfectly with our mission statement to: Conserve, Protect and Restore cold water fisheries and their watersheds in southwest Montana. In fact, GGTU has been supporting this work with funding and volunteer hours to remediate and restore the drainage. Not only does it benefit the fisheries resource it also provides jobs in our area. There's no reason to continue to pollute the Big Hole River. It's not going to get better without help. Now is the time to fund and complete the project. ***Cold, Clean, Fishable Water*** benefits everyone in the Big Hole Valley.

Thank you.

Roy Morris
Past President
George Grant TU
PO Box 563
Butte, MT 59703
president@ggtu.org
406-491-4255

September 14, 2017

Montana Department of Environmental Quality
Non-Point Source 319 Funding
PO Box 200901
Helena, Montana 59620

Dear Montana DEQ,

As a local fly fisherman living close to French Creek I support the restoration work being done on French Creek in the Mount Haggin Wildlife Management Area. I bought property in 1982 and built our home in 1990 a mile from French Creek and I fish the creek as often as I can. Over the years I have seen a big improvement in the fishery since restoration work has been done in the French Creek drainage on the Wildlife Management Area.

I support the partnership and efforts of Montana Fish, Wildlife and Parks and the Big Hole Watershed Committee to continue their restoration work on this valuable fishery. I hope the non-point source 319 program will fund the proposed work. I have seen the clay banks eroding, discoloring the stream and having an impact on the fishery.

Other work already completed in French Gulch, the California uplands and California Creek have rebuilt natural stream channels and greatly reduced sediment loads in the creek. All this previous work has improved fish and wildlife habitat. I have noticed the fish are in better condition and larger than they have been prior to the restoration work that has been completed.

I would hope funding will be provided to continue restoration work on this fishery. I have seen an increase in the number of grayling being caught since sediment loads have been greatly reduce after completion of past restoration work. I've also noticed the health and condition of westslope cutthroat, brooktrout and rainbow trout has also improved.

Approval of funding under the non-point source 319 program will help in continuing the restoration work in French Creek.

Thank you.

Sincerely,

Paul Olson

Paul Olson
524 Wolf Ridge Road
Wise River, MT 59762

Sunrise Fly Shop
472 Main St
Melrose, MT 59743
sunriseflyshop.com

Montana Department of Environmental Quality
Non-Point Source 319 Funding
PO Box 200901
Helena, Montana 59620

Dear Montana DEQ,

I would like to pledge my support for stream restoration work on French Creek on the Mount Haggin Wildlife Management Area. I support the partnership and efforts of Montana Fish, Wildlife and Parks and the Big Hole Watershed Committee to complete this work. I encourage the non-point source 319 program to fund the proposed work.

The French Creek portion of work will build upon successful restoration upstream in French Gulch, Moose Creek, and California Creek all of which have rebuilt natural streams, connected floodplains, increased natural water storage, reduced sediment loads, and improved fish and wildlife habitat. The proposed French Creek work will continue to support a transformation on the state owned land from historic damage to a thriving ecosystem.

Montana's fishing industry brings millions of dollars to State's economy every year. The success of the fishing and outfitting industries are dependent on healthy fish and naturally reproducing fish populations. Without clean water and thriving riparian habitats, healthy populations of fish cannot exist. The restoration work on French Creek will help to improve the overall water quality of the Big Hole River, which will insure future generations of healthy fish.

The Big Hole River is the lifeblood of all Big Hole Valley communities. Improving the overall health of the Big Hole Watershed directly benefits all the Big Hole River's rural communities.

Thank you.

Sincerely,

Eric Thorson
Co-Owner of Sunrise Fly Shop

Morrison Maierle
engineers • surveyors • planners • scientists

1 ENGINEERING PLACE • P.O. BOX 6147 • HELENA, MT 59604
406.442.3050 • www.m-m.net

May 24, 2019

Pedro Marques
Big Hole Watershed Committee
PO Box 21
Divide, MT 59727

RE: Lower French Creek& Oregon Creek Restoration Award Recommendation

Dear Pedro:

Construction bids were opened for the Lower French & Oregon Creek Restoration Project on May 23, 2019 at 12pm. There were two qualified bidders. We have reviewed the bid information submitted and found Watershed Consulting, LLC to be the lowest responsible bidder. The bid amount submitted was $298,785.00.00 for Schedule 1 – Lower French Creek and $94,013.80 for Schedule 2 – Oregon Creek. The total base bid is $392,798.80 for both schedules. The certified bid tabulations with all bid amounts is attached.

Upon your approval we will proceed with preparing a Notice of Award form to issue to the lowest responsible bidder. Once the Notice of Award have been issued we will prepare the required number of construction contracts and facilitate execution of the Agreement and required documentation. We will then return bid bonds to the unsuccessful bidders once the Agreement is executed between the Contractor and Big Hole Watershed Committee.

When the executed Agreement is complete we will schedule a pre-construction meeting with yourself, the Contractor and their subs to discuss the project schedule, Notice to Proceed, and other project coordination items.

We are excited to assist with the construction of this project.

Sincerely,

MORRISON-MAIERLE, INC.

Matt Barnes, PE, CFM
Project Manager

Attachments: Bid Tabulations

R:\5406-BHWC\00401\05 Bidding\Bid Award\French-Oregon_Award Recommendation.docx

Morrison Maierle
engineers • surveyors • planners • scientists

Lower French Creek & Oregon Creek Restoration

Big Hole Watershed Committee

Lower French Creek - Schedule 1

ITEM NO.	DESCRIPTION	EST. QTY	UNIT	Engineer's Estimate UNIT PRICE	Engineer's Estimate TOTAL EST. PRICE	Watershed Consulting UNIT PRICE	Watershed Consulting TOTAL EST. PRICE	Mungas Construction UNIT PRICE	Mungas Construction TOTAL EST. PRICE
101	Taxes, Bonds, and Insurance	1	LS	$20,000.00	$20,000.00	$11,000.00	$11,000.00	$13,877.20	$13,877.20
102	General Requirements	1	LS	$20,000.00	$20,000.00	$8,280.00	$8,280.00	$11,101.76	$11,101.76
103	Mobilization/Demobilization	1	LS	$15,000.00	$15,000.00	$15,072.00	$15,072.00	$13,877.20	$13,877.20
104	Water & Erosion Control	1	LS	$12,000.00	$12,000.00	$8,312.00	$8,312.00	$6,954.22	$6,954.22
105	Earthwork	1	LS	$180,000.00	$180,000.00	$86,000.00	$86,000.00	$95,533.68	$95,533.68
106	Import Streambed Material	3,000	CY	$20.00	$60,000.00	$7.60	$22,800.00	$33.88	$101,640.00
107	Willow Streambanks	1,150	LF	$15.00	$17,250.00	$22.30	$25,645.00	$9.98	$11,477.00
108	Wood Habitat Structure	16	EA	$200.00	$3,200.00	$786.00	$12,576.00	$453.18	$7,250.88
109	Abandoned Channel Plug	2	EA	$1,500.00	$3,000.00	$11,480.00	$22,960.00	$7,503.73	$15,007.46
110	Topsoil/Vegetation Salvaging & Stockpiling	1	LS	$19,500.00	$19,500.00	$57,340.00	$57,340.00	$16,223.51	$16,223.51
111	Revegetation	1	LS	$22,046.00	$22,046.00	$28,670.00	$28,670.00	$23,232.84	$23,232.84
112	Excavator Time	1	HR	$0.00	$0.00	$130.00	$130.00	$220.10	$220.10
	SCH. 1 BID TOTAL				**$371,996.00**		**$298,785.00**		**$316,395.85**

Oregon Creek - Schedule 2

ITEM NO.	DESCRIPTION	EST. QTY	UNIT	Engineer's Estimate UNIT PRICE	Engineer's Estimate TOTAL EST. PRICE	Watershed Consulting UNIT PRICE	Watershed Consulting TOTAL EST. PRICE	Mungas Construction UNIT PRICE	Mungas Construction TOTAL EST. PRICE
201	Taxes, Bonds, and Insurance	1	LS	$10,000.00	$10,000.00	$4,000.00	$4,000.00	$3,639.65	$3,639.65
202	General Requirements	1	LS	$10,000.00	$10,000.00	$2,200.00	$2,200.00	$2,911.72	$2,911.72
203	Mobilization/Demobilization	1	LS	$7,500.00	$7,500.00	$6,518.00	$6,518.00	$3,639.65	$3,639.65
204	Water & Erosion Control	1	LS	$5,000.00	$5,000.00	$2,860.00	$2,860.00	$4,608.40	$4,608.40
205	Earthwork - Floodplain	1	LS	$36,000.00	$36,000.00	$15,433.00	$15,433.00	$30,014.92	$30,014.92
206	Stream Channel Shaping	1,370	LF	$5.00	$6,850.00	$14.45	$19,796.50	$5.12	$7,014.40
207	Detention Ridge	1,010	LF	$10.00	$10,100.00	$19.83	$20,028.30	$13.08	$13,210.80
208	Topsoil/Vegetation Salvaging & Stockpiling	1	LS	$10,500.00	$10,500.00	$6,793.00	$6,793.00	$8,405.34	$8,405.34
209	Revegetation	1	LS	$2,000.00	$2,000.00	$16,385.00	$16,385.00	$9,546.63	$9,546.63
	SCH. 2 BID TOTAL				**$97,950.00**		**$94,013.80**		**$82,991.51**

COMPLETE PROJECT BID TOTAL	**$469,946.00**	**$392,798.80**	**$399,387.36**

Additive Alternates

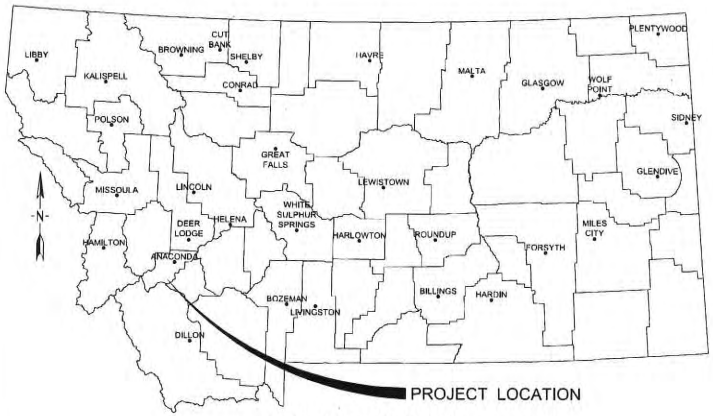
ITEM NO.	DESCRIPTION	EST. QTY	UNIT	Engineer's Estimate UNIT PRICE	Engineer's Estimate TOTAL EST. PRICE	Watershed Consulting UNIT PRICE	Watershed Consulting TOTAL EST. PRICE	Mungas Construction UNIT PRICE	Mungas Construction TOTAL EST. PRICE
	Wetlands Creation Area #1	1	LS	-	-	$7,560.00	$7,560.00	$3,024.00	$3,024.00
	Wetlands Creation Area #2	1	LS	-	-	$15,457.00	$15,457.00	$7,088.00	$7,088.00
	Wetlands Creation Area #3	1	LS	-	-	$4,950.00	$4,950.00	$1,650.00	$1,650.00
	Wetlands Creation Area #4	1	LS	-	-	$18,854.00	$18,854.00	$4,740.00	$4,740.00
	Wetlands Creation Area #5	1	LS	-	-	$23,334.00	$23,334.00	$9,660.00	$9,660.00
	Wetlands Creation Area #6	1	LS	-	-	$10,304.00	$10,304.00	$3,024.00	$3,024.00
	Wetlands Creation Area #7	1	LS	-	-	$7,357.00	$7,357.00	$2,688.00	$2,688.00
	Wetlands Creation Area #8	1	LS	-	-	$32,084.00	$32,084.00	$9,150.00	$9,150.00
	Wetlands Creation Area #9	1	LS	-	-	$12,734.00	$12,734.00	$2,160.00	$2,160.00
	ADD. ALTERNATE TOTAL						**$132,634.00**		**$43,184.00**

The tabulation of bids herein is a true representation of the bids received on May 23rd, 2019.

Denotes math correction

Matt Barnes, PE, CFM
Morrison-Maierle, Inc.

FINAL DESIGN DRAWINGS FOR
FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY, MONTANA
04/2019



LOCATION MAP
NOT TO SCALE

PREPARED BY:

Morrison Maierle
engineers • surveyors • planners • scientists

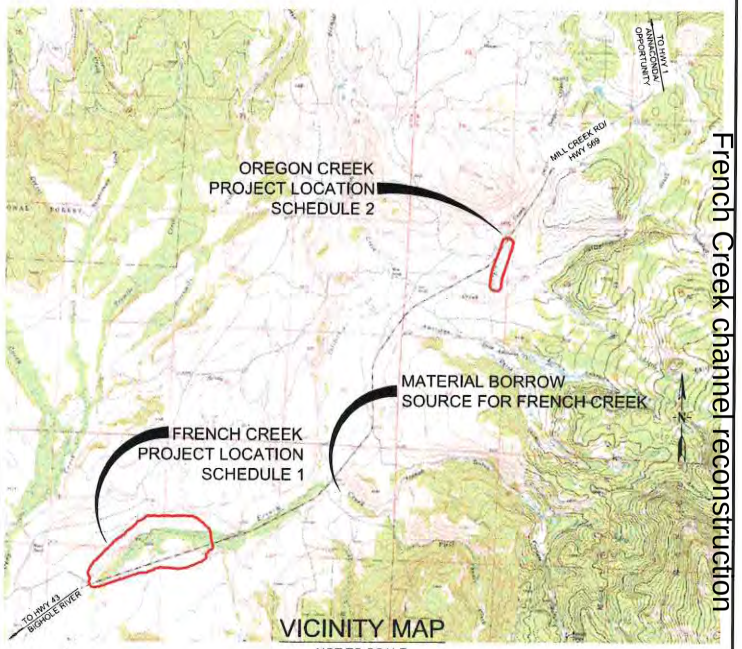
1 Engineering Place, Helena, MT 59602
406.442.3050 www.m-m.net

PREPARED FOR:

BIG HOLE WATERSHED COMMITTEE
Conservation Through Cooperation

MONTANA FISH, WILDLIFE & PARKS

SHEET INDEX	
DRAWING NUMBER	SHEET TITLE
-	COVER SHEET
G-1	GENERAL LEGEND AND NOTES
G-2	EXISTING CONDITIONS
C-1	OVERALL SITE AND ACCESS MAP
C-2	PLAN & PROFILE STA. 0+00 TO STA. 12+00
C-3	PLAN & PROFILE STA. 12+00 TO STA. 24+00
C-4	PLAN & PROFILE STA. 24+00 TO STA. 36+00
C-5	PLAN & PROFILE STA. 36+00 TO STA. 40+31
C-6	CROSS SECTIONS STA. 0+50 TO STA. 13+25
C-7	CROSS SECTIONS STA. 13+75 TO STA. 27+75
C-8	CROSS SECTIONS STA. 29+00 TO STA. 39+50
C-9	CUT AND FILL MAP STA. 0+00 TO STA. 24+00
C-10	CUT AND FILL MAP STA. 24+00 TO STA. 40+31
C-11	WETLANDS PLAN 1
C-12	WETLANDS PLAN 2
D-1	CHANNEL TYPICAL SECTIONS AND DETAILS
D-2	CHANNEL STABILIZATION STRUCTURE DETAILS
D-3	FLOODPLAIN AND ABANDONED CHANNEL DETAILS
D-4	FLOODPLAIN AND WETLAND TYPICAL SECTIONS AND DETAILS



VICINITY MAP
NOT TO SCALE

811 Know what's below. Call before you dig.

MONTANA REGISTERED PROFESSIONAL ENGINEER
MATTHEW D BARNES
No. 32934 PE
LICENSED
4/15/2019

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VERIFY COLOR!
THIS SHEET IS INTENDED TO BE IN COLOR, RED, GREEN AND BLUE WILL BE VISIBLE IF REPRODUCED CORRECTLY.

APPROVED BY:
MATT BARNES, PE, CFM
Project Manager

Morrison Maierle
engineers • surveyors • planners • scientists

QUALITY ASSURANCE	
MATT BARNES, PE, CFM	4/4/2019
PROJECT MANAGER WILLIAM WIEGAND, JR., PE	Q.A. APPROVAL DATE 000112-20-04
OFFICE QUALITY ASSURANCE COORDINATOR MARK BROOKE, PE, PG	Q.A. PROJECT NUMBER
PEER REVIEWER	

MORRISON-MAIERLE PROJECT NO. 5406.004.01

R:\5406-BHWC\DD\401\ACAD\SHEETS\0 COVER SHEET.DWG PLOTTED BY: ZACHARIAH CAMPBELL ON Apr/05/2019

GENERAL NOTES

1. SITE SURVEYED ON 9/24/18 AND 9/25/18 WITH RTK AND UAS EQUIPMENT.
2. HORIZONTAL DATUM= NAD 83 MONTANA STATE PLANE, INTERNATIONAL FEET, VERTICAL DATUM= NAVD88.
3. ALL EXISTING CONTROL POINTS, SURVEY MONUMENTS, AND STAKING SHALL BE PRESERVED OR REPLACED. REPLACEMENT SHALL BE TO SAME LEVEL OF ACCURACY IN A TIMELY MANNER AT CONTRACTOR'S EXPENSE.
4. EXISTING FEATURES AND UTILITIES SHOWN ON PLANS ARE BASED ON INFORMATION AVAILABLE AT TIME PLANS WERE PREPARED. CONTRACTORS ARE RESPONSIBLE FOR BURIED UTILITY LOCATES. CONTRACTOR SHALL INFORM ENGINEER IMMEDIATELY IF DISCREPANCY IS FOUND IN EXISTING FEATURES OR CONDITIONS THAN THOSE SHOWN.
5. ACCESS TO WORK AREAS SHALL BE BY DEFINED ROUTES SHOWN ON PLANS OR AS APPROVED BY ENGINEER. AREAS OUTSIDE WORK AREAS, STAGING AREAS, AND STOCK PILE AREAS SHALL BE PRESERVED TO MAXIMUM EXTENT POSSIBLE.
6. ALL EXISTING ROADS, GATES, CROSSINGS, ETC. SHALL BE PRESERVED IN EXISTING CONDITION. IF IMPACTS OCCUR DURING CONSTRUCTION, CONTRACTOR SHALL REPAIR AND/ OR REPLACE AT CONTRACTORS EXPENSE. ENGINEER SHALL APPROVE ALL REPAIRS.
7. CONTRACTOR SHALL REVIEW AND ABIDE BY ALL INFORMATION AND REQUIREMENTS FOUND IN PROJECT PERMITS. COPIES OF PERMITS ARE INCLUDED IN PROJECT MANUAL.
8. PROJECT IS LOCATED ON THE MOUNT HAGGIN WILDLIFE MANAGEMENT AREA OWNED BY MONTANA FISH, WILDLIFE, AND PARKS.
9. OWNER WILL COMPLETE ALL SEEDING FOR THE PROJECT.
10. CONTRACTOR SHALL RESTORE AND PREPARE ACCESS ROUTES FOR SEEDING BY OWNER. THIS SHALL INCLUDE ALL RE-CONTOURING, DECOMPRESSING, AND SLASH PLACEMENT.

EROSION CONTROL NOTES

1. CONTRACTOR IS RESPONSIBLE FOR MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM (MPDES) PERMIT. CONTRACTOR SHALL DEVELOP STORM WATER POLLUTION PREVENTION PLAN (SWPPP), DEWATERING AND DIVERSION PLAN, EROSION AND DUST CONTROL PLAN FOR PERMIT REQUIREMENTS.
2. CONTRACTOR SHALL SUBMIT ALL MPDES DOCUMENTATION INCLUDING NOTICE OF INTENT, SWPPP, AND NOTICE OF TERMINATION. COPIES OF ALL MPDES DOCUMENTS SHALL BE PROVIDED TO ENGINEER WHEN SUBMITTED TO MONTANA DEQ.
3. WATER FOR CONSTRUCTION PURPOSES SHALL BE OBTAINED BY CONTRACTOR AT THEIR EXPENSE. ALL APPLICABLE PERMITS RELATED TO CONSTRUCTION WATER ALL THE CONTRACTOR'S RESPONSIBILITY AND ARE INCIDENTAL TO THE WORK.

ABBREVIATIONS

NIC = NOT IN CONTRACT

FG = FINISHED GROUND

EG = EXISTING GROUND

LEGEND

- MINOR EXISTING CONTOUR
- MAJOR EXISTING CONTOUR
- MINOR PROPOSED CONTOUR
- MAJOR PROPOSED CONTOUR
- CONSTRUCTION ACCESS ROUTE
- EXISTING ROAD
- EXISTING WETLAND AREAS (SEPTEMBER 2018)
- EXISTING STREAM CHANNEL
- NEW STREAM CHANNEL
- NEW WETLANDS CREATION AREAS
- WILLOW STREAM BANK
- WOOD HABITAT STRUCTURE
- CONSTRUCTED RIFFLE
- ABANDONED CHANNEL PLUG
- FLOODPLAIN WILLOW ROW

DESIGN BASIS

THIS PROJECT IS BEING COMPLETED TO REMOVE IMPAIRMENTS TO THE ENVIRONMENT AND WATERSHED IDENTIFIED BY FWP AND BHWC. THE GOALS OF THIS PROJECT ARE TO: REDUCE FINE SEDIMENT DELIVERY TO LOWER FRENCH CREEK, RESTORE MORE NATURAL CHANNEL MIGRATION SETTINGS, AND IMPROVE NATIVE FISH HABITAT. THE STREAM RESTORATION AND WETLANDS CREATION DESIGN USES CURRENT STANDARD OF PRACTICE AND GUIDANCE TO CREATE NEAR REFERENCE CONDITIONS. THE DESIGN IS MEANT TO RESTORE NATURAL VARIABILITY AND PROCESSES. THERE IS INHERENT RISK WITH RESTORATION TO ALLOW NATURAL VARIABILITY AND DEFORMABILITY. THE STREAM CHANNEL FEATURES HAVE BEEN DESIGNED TO REMAIN STABLE UP APPROXIMATELY THE BANKFULL FLOW RATE (50% ANNUAL CHANCE EXCEEDANCE) OF 120 CFS. TO PROVIDE INCREASED OVERBANK FLOWS ANNUALLY, THE DESIGN CHANNEL RIFFLE CROSS SECTION GEOMETRY HAS PURPOSELY BEEN UNDERSIZED ABOUT 20% OF THE REFERENCE CROSS SECTION AREA.

GENERAL DESIGN DESIGNATIONS

DETAIL AND SECTION DESIGNATION - WHERE TAKEN DETAIL AND SECTION DESIGNATION - WHERE SHOWN

VERIFY SCALE! THESE PRINTS MAY BE REDUCED. LINE BELOW MEASURES ONE INCH ON ORIGINAL DRAWING. MODIFY SCALE ACCORDINGLY!

REVISIONS

NO.	DESCRIPTION	BY	DATE

K:\5406-BHWC\GIS\MTA\CAD\SHEETS\1 GENERAL LEGEND AND NOTES.DWG PLOTTED BY ZACHARIAH CAMPBELL ON 10/08/2019

Morrison Maierle
engineers · surveyors · planners · scientists
1 Engineering Place
Helena, MT 59602
406.442.3050
www.m-m.net

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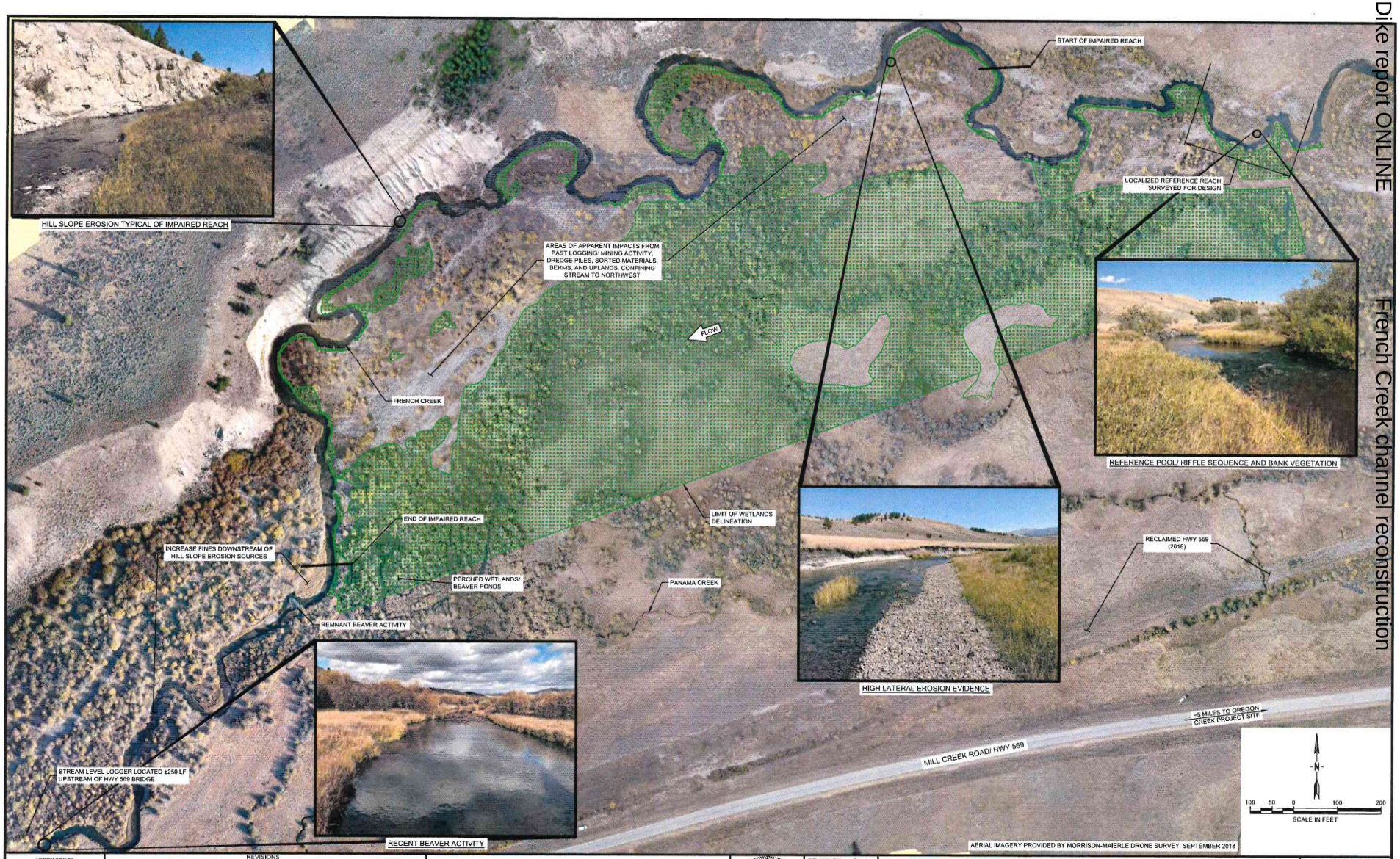
MONTANA MATTHEW D. BARNES No. 32934 PE LICENSED PROFESSIONAL ENGINEER

DRAWN BY	DAH
DSGN. BY	MDB
APPR. BY	MDB
DATE	04/2019
Q.C. REVIEW BY	MTB
DATE	04/2019

FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA
GENERAL LEGEND AND NOTES

PROJECT NUMBER 5406.004.01
SHEET NUMBER -
DRAWING NUMBER G-1



VERIFY SCALE!
THESE PRINTS MAY BE REDUCED, LINE BELOW MEASURES ONE INCH ON ORIGINAL DRAWING.
MODIFY SCALE ACCORDINGLY!

REVISIONS

NO.	DESCRIPTION	BY	DATE

N:\5406-BHWC\04\01\ACAD\SHEETS\2 EXISTING CONDITIONS.DWG PLOTTED BY ZACHARIAH CAMPBELL ON Apr-05/2019

Morrison Maierle
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MATTHEW B. FARMER
No. 32314 PE
REGISTERED PROFESSIONAL ENGINEER

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DSGN. BY	MDB
APPR. BY	MDB
DATE	04/2019
Q.C. REVIEW BY	MTB
DATE	04/2019

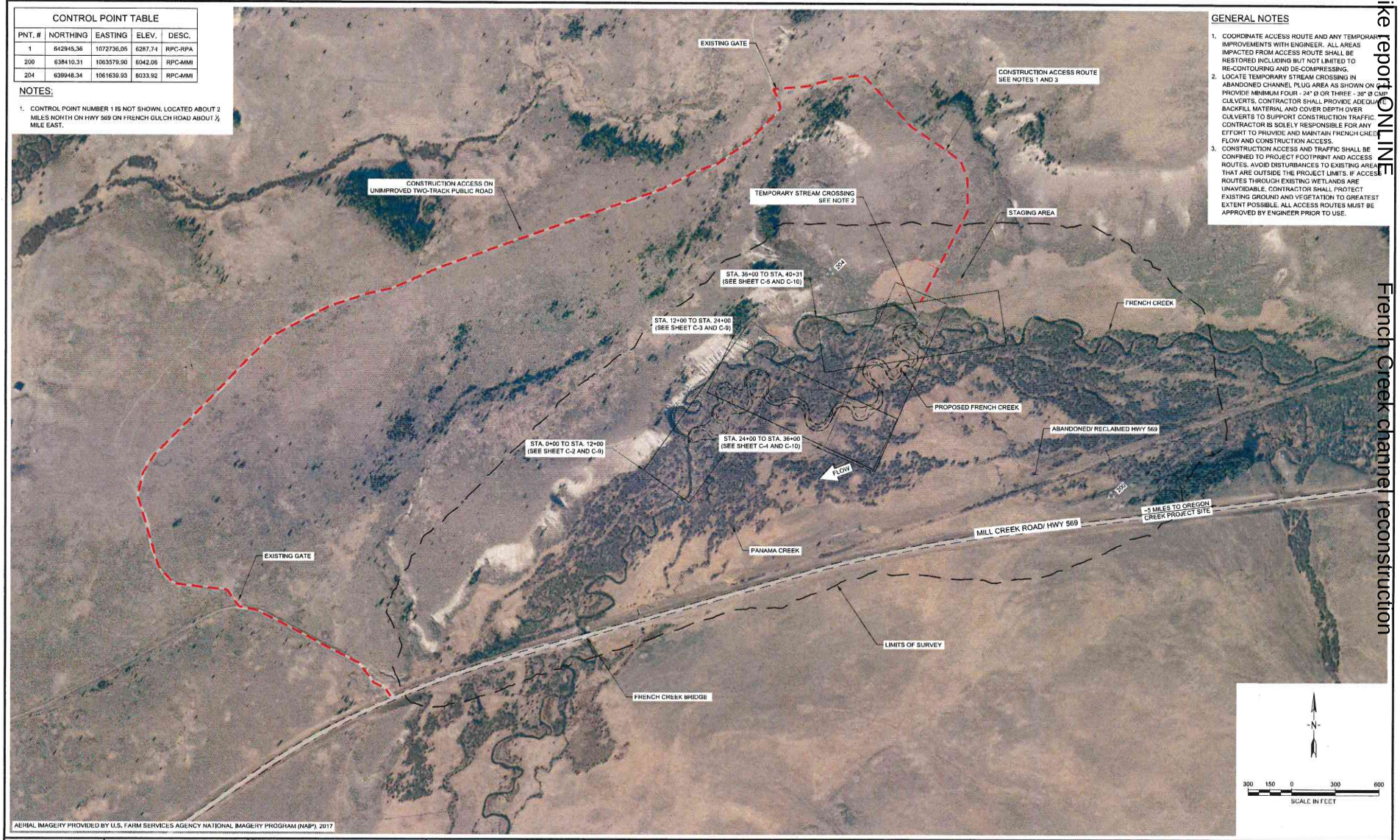
FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA
EXISTING CONDITIONS

PROJECT NUMBER 5406.004.01
SHEET NUMBER -
DRAWING NUMBER G-2

CONTROL POINT TABLE				
PNT. #	NORTHING	EASTING	ELEV.	DESC.
1	642945.36	1072736.05	6287.74	RPC-RPA
200	638410.31	1063579.90	6042.06	RPC-MMI
204	639948.34	1061639.93	6033.92	RPC-MMI

NOTES:

1. CONTROL POINT NUMBER 1 IS NOT SHOWN. LOCATED ABOUT 2 MILES NORTH ON HWY 569 ON FRENCH GULCH ROAD ABOUT ½ MILE EAST.



GENERAL NOTES

1. COORDINATE ACCESS ROUTE AND ANY TEMPORARY IMPROVEMENTS WITH ENGINEER. ALL AREAS IMPACTED FROM ACCESS ROUTE SHALL BE RESTORED INCLUDING BUT NOT LIMITED TO RE-CONTOURING AND DE-COMPRESSING.
2. LOCATE TEMPORARY STREAM CROSSING IN ABANDONED CHANNEL PLUG AREA AS SHOWN ON C-4. PROVIDE MINIMUM FOUR - 24" Ø OR THREE - 36" Ø CMP CULVERTS. CONTRACTOR SHALL PROVIDE ADEQUATE BACKFILL MATERIAL AND COVER DEPTH OVER CULVERTS TO SUPPORT CONSTRUCTION TRAFFIC. CONTRACTOR IS SOLELY RESPONSIBLE FOR ANY EFFORT TO PROVIDE AND MAINTAIN FRENCH CREEK FLOW AND CONSTRUCTION ACCESS.
3. CONSTRUCTION ACCESS AND TRAFFIC SHALL BE CONFINED TO PROJECT FOOTPRINT AND ACCESS ROUTES. AVOID DISTURBANCES TO EXISTING AREAS THAT ARE OUTSIDE THE PROJECT LIMITS. IF ACCESS ROUTES THROUGH EXISTING WETLANDS ARE UNAVOIDABLE, CONTRACTOR SHALL PROTECT EXISTING GROUND AND VEGETATION TO GREATEST EXTENT POSSIBLE. ALL ACCESS ROUTES MUST BE APPROVED BY ENGINEER PRIOR TO USE.

AERIAL IMAGERY PROVIDED BY U.S. FARM SERVICES AGENCY NATIONAL IMAGERY PROGRAM (NAIP), 2017

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NO.	DESCRIPTION	BY	DATE

R:\5406-BHWC\0401\ACAD\SHEETS\3 OVERALL SITE MAP.DWG PLOTTED BY ZACHARIAH CAMPBELL ON Apr/05/2019

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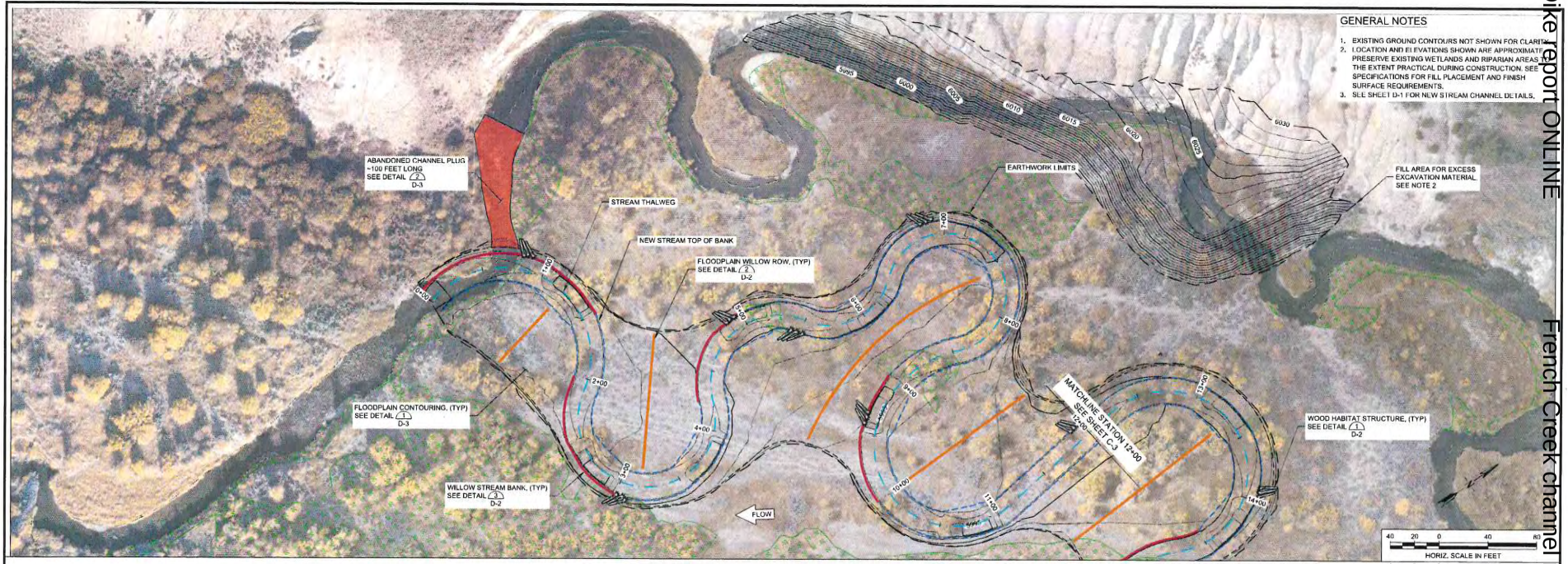
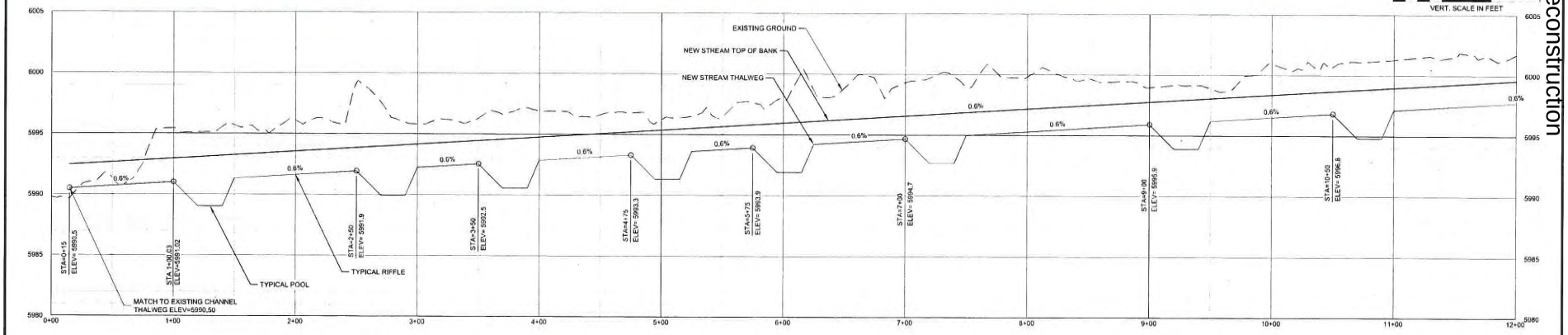
DATE:	04/2019

FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA
OVERALL SITE AND ACCESS MAP

PROJECT NUMBER 5406.004.01
SHEET NUMBER -
DRAWING NUMBER C-1





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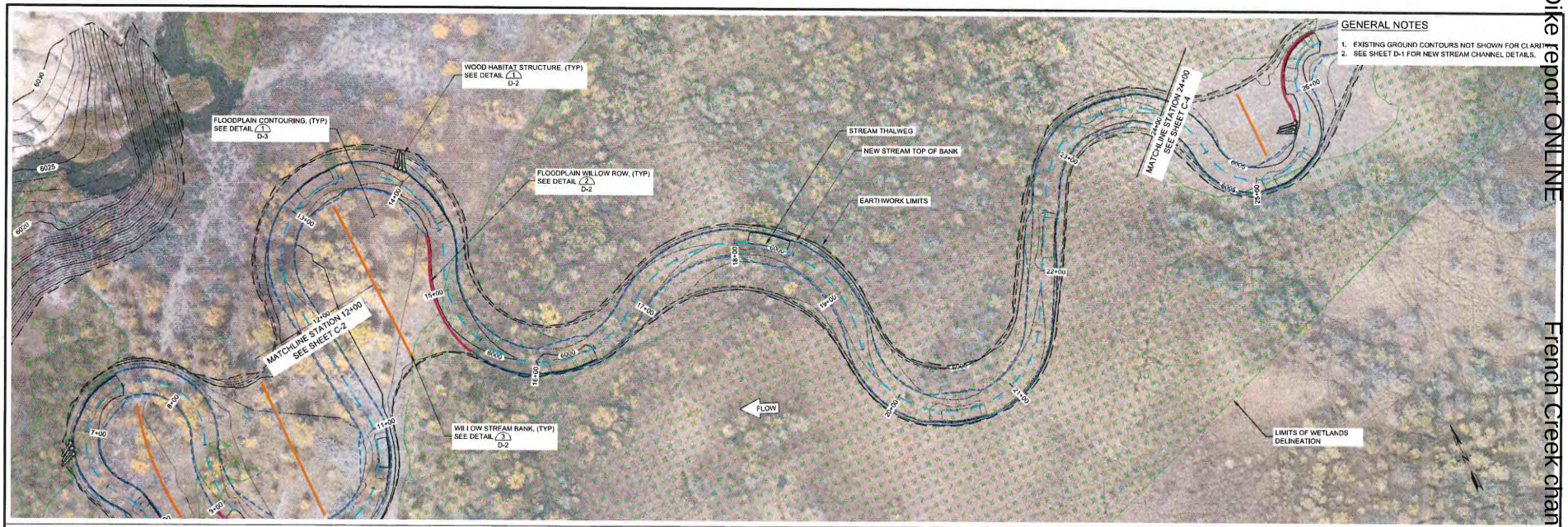
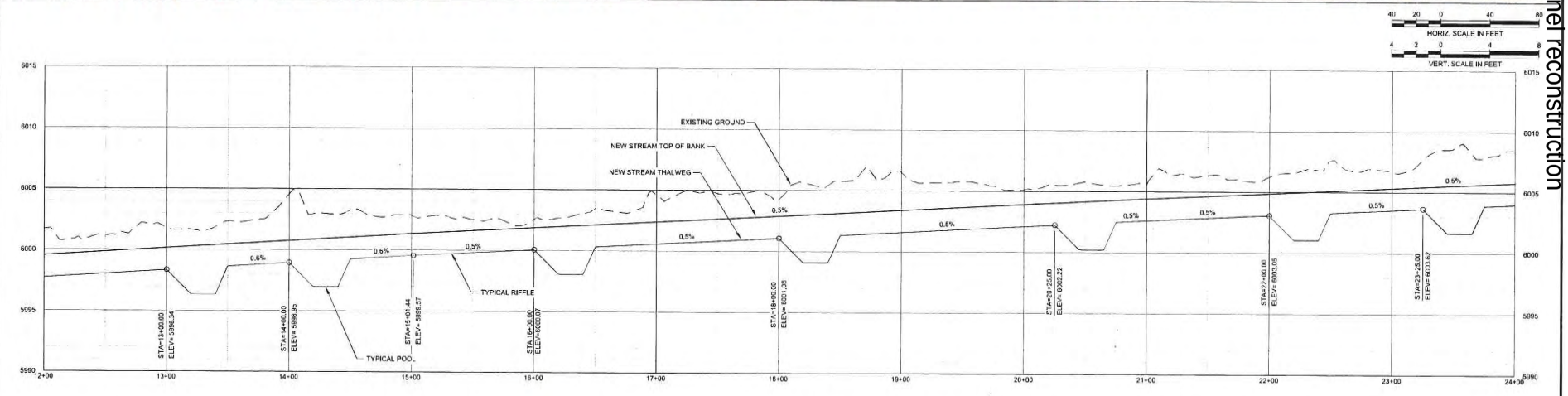
Q.C. REVIEW BY	MHB
DATE	04/2019

FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA
PLAN AND PROFILE STA. 0+00 TO STA. 12+00

PROJECT NUMBER 5406.004.01
SHEET NUMBER -
DRAWING NUMBER C-2





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REVISIONS			
NO.	DESCRIPTION	BY	DATE

R:\5406\BHWC\04011\ACAD\SHEETS\5 PLAN & PROFILE STA. 12+00 TO STA. 24+00.DWG PLOTTED BY ZACHARIAH CAMPBELL ON Apr/05/2019

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STATE OF MONTANA

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APPR. BY	MDB
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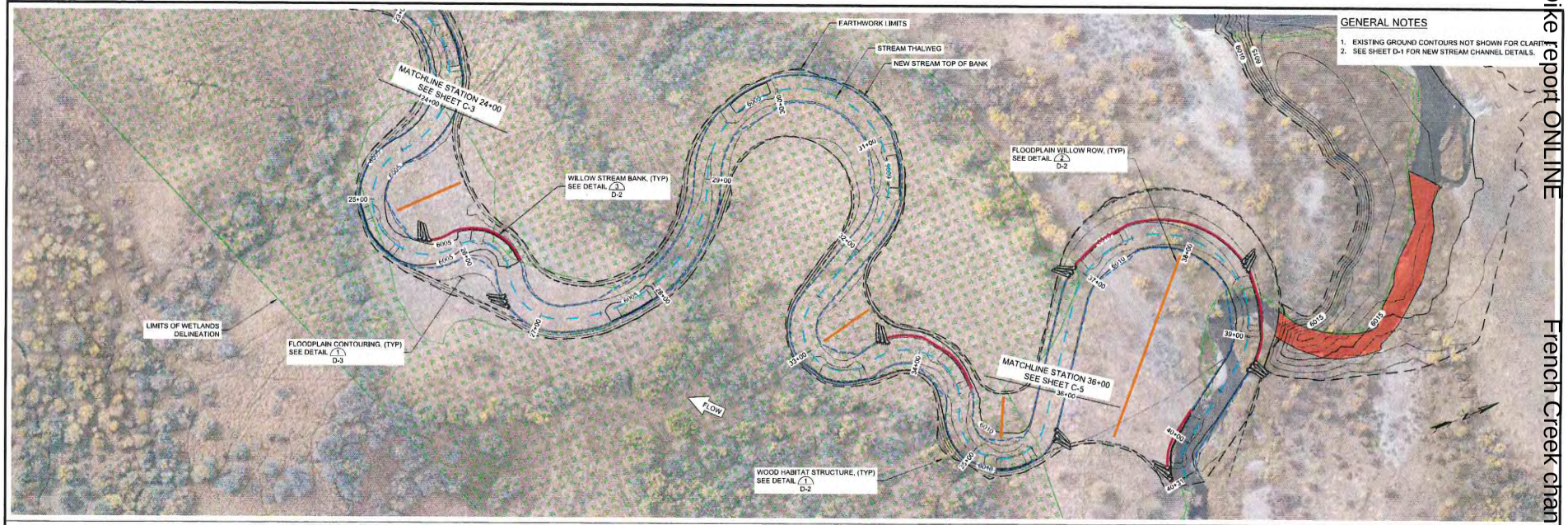
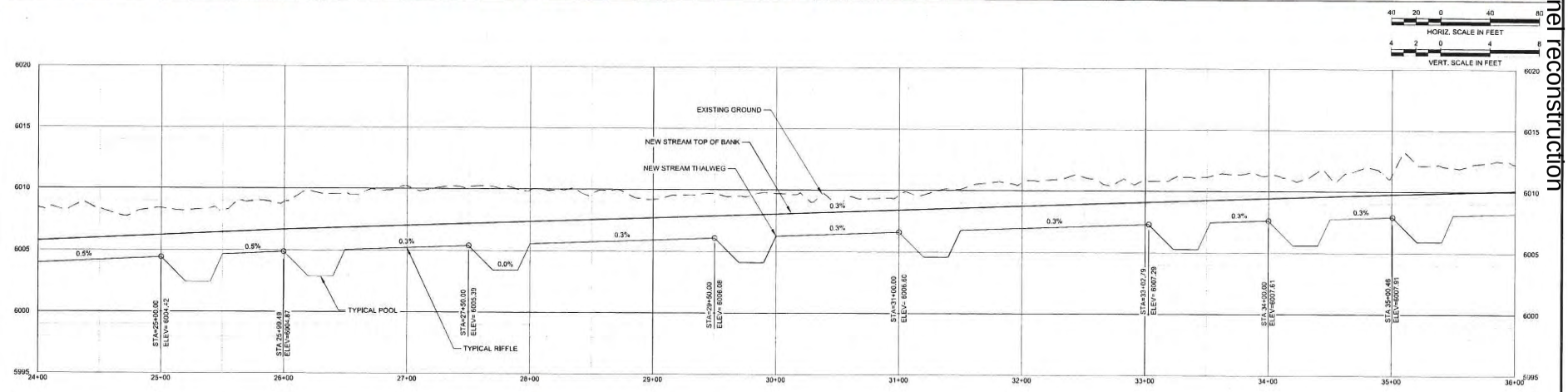
Q.C. REVIEW BY	MTB
DATE	04/2019

FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA
PLAN AND PROFILE STA. 12+00 TO STA. 24+00

PROJECT NUMBER	5406.004.01
SHEET NUMBER	
DRAWING NUMBER	C-3





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REVISIONS			
NO.	DESCRIPTION	BY	DATE

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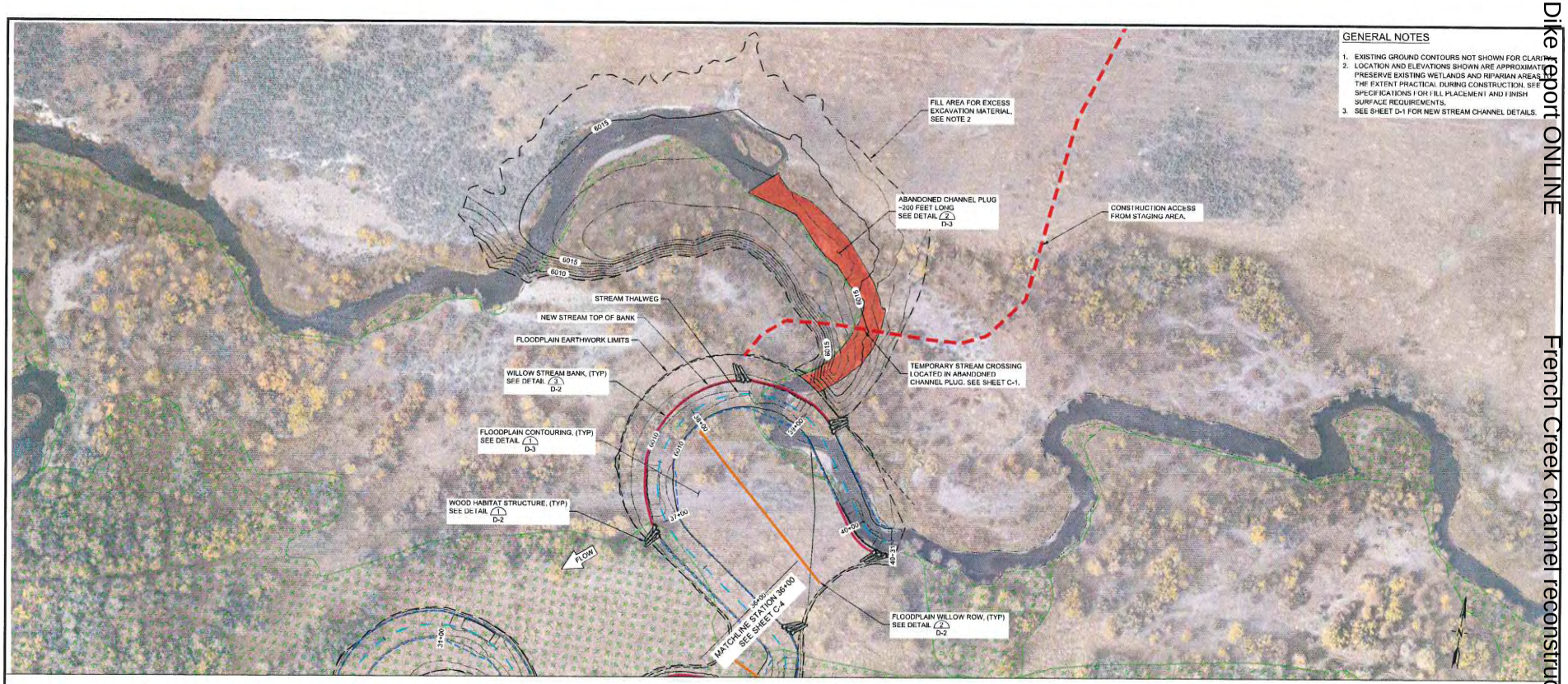
FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA
PLAN AND PROFILE STA. 24+00 TO STA. 36+00

PROJECT NUMBER 5406.004.01
SHEET NUMBER
DRAWING NUMBER C-4

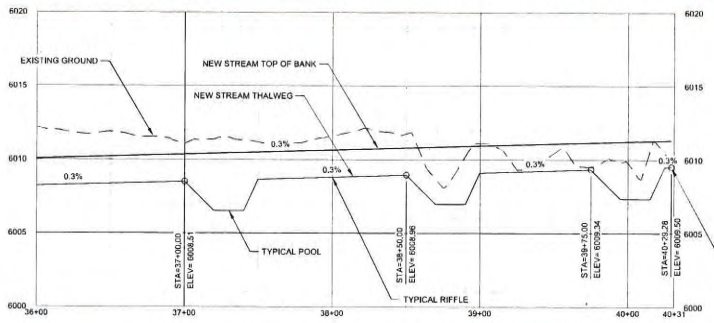
EA & Dike report ONLINE

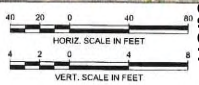
French Creek channel reconstruction



GENERAL NOTES

1. EXISTING GROUND CONTOURS NOT SHOWN FOR CLARITY.
2. LOCATION AND ELEVATIONS SHOWN ARE APPROXIMATE. PRESERVE EXISTING WETLANDS AND RIPARIAN AREAS TO THE EXTENT PRACTICAL DURING CONSTRUCTION. SEE SPECIFICATIONS FOR FILL PLACEMENT AND FINISH SURFACE REQUIREMENTS.
3. SEE SHEET D-1 FOR NEW STREAM CHANNEL DETAILS.





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APPR. BY	MDB
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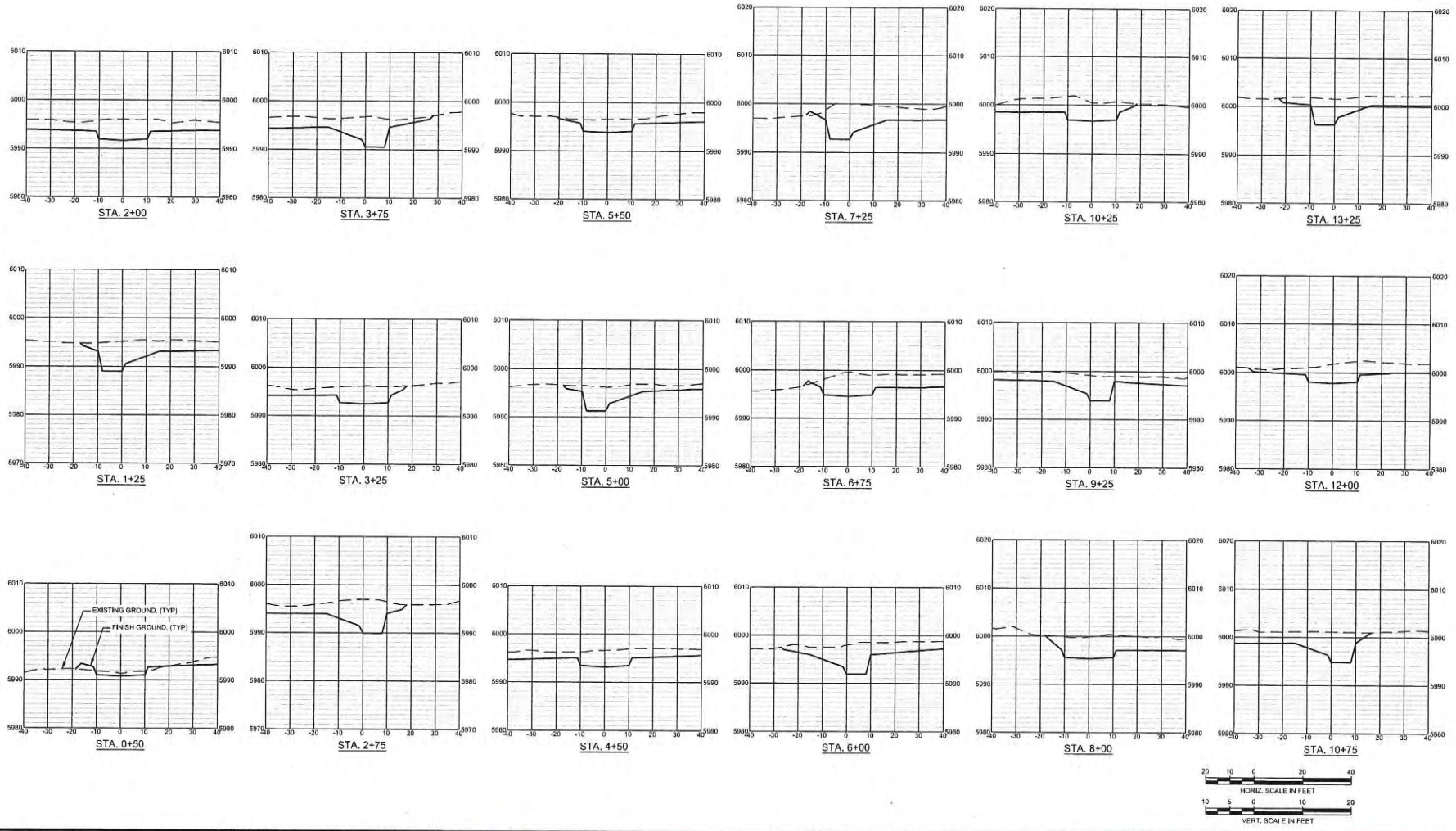
Q.C. REVIEW BY	MTB
DATE	04/2019

FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA
PLAN AND PROFILE STA. 36+00 TO STA. 40+31

PROJECT NUMBER 5406.004.01
SHEET NUMBER -
DRAWING NUMBER C-5



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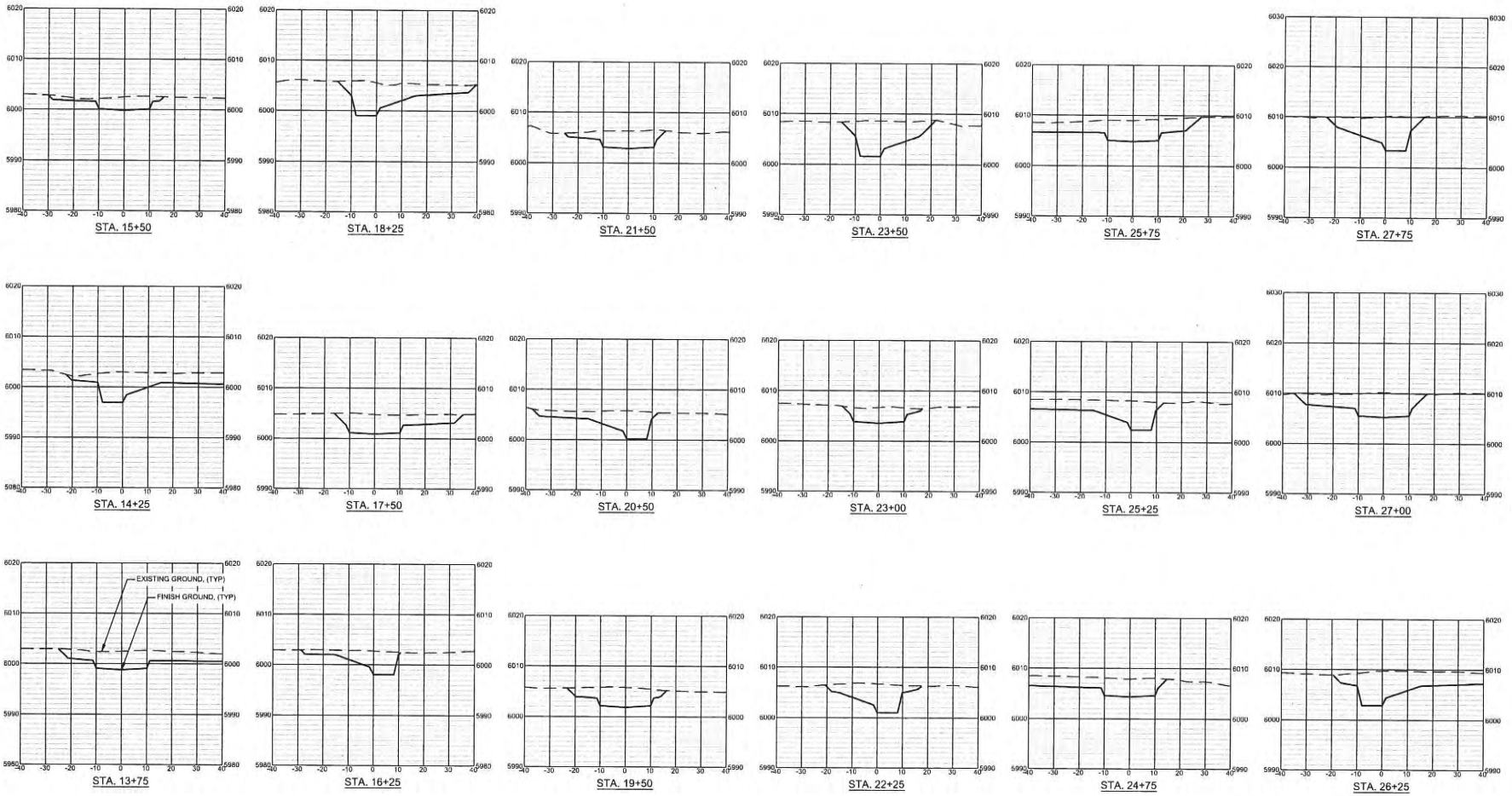
APPR. BY	MDB
DATE	04/2019
Q.C. REVIEW BY:	MTB
DATE:	04/2019

FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA
CROSS SECTIONS STA. 0+50 TO STA. 13+25

PROJECT NUMBER	5406.004.01
SHEET NUMBER	-
DRAWING NUMBER	C-6



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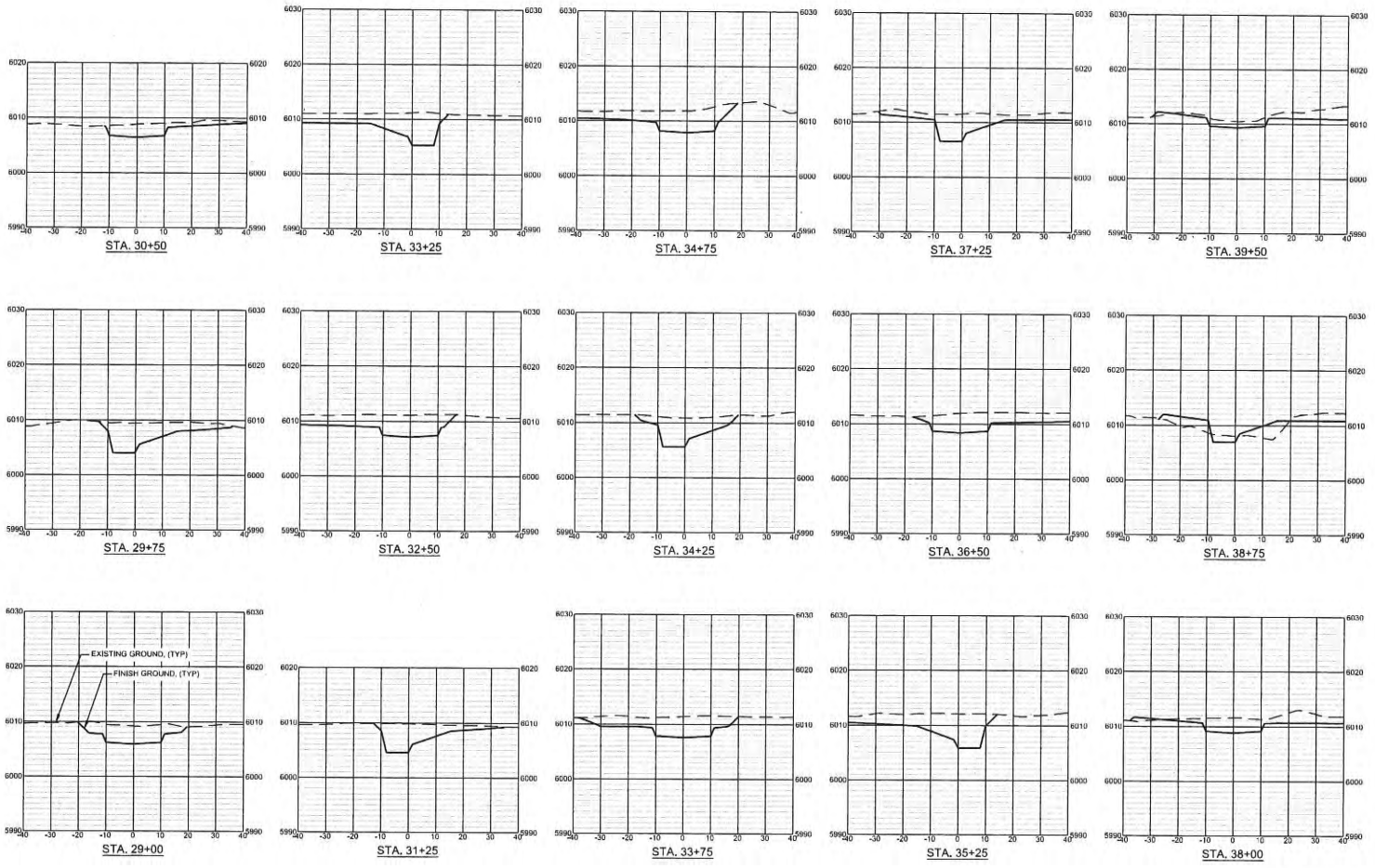
DATE	04/2019

FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA
CROSS SECTIONS STA. 13+75 TO STA. 27+75

PROJECT NUMBER	5406.004.01
SHEET NUMBER	-
DRAWING NUMBER	C-7



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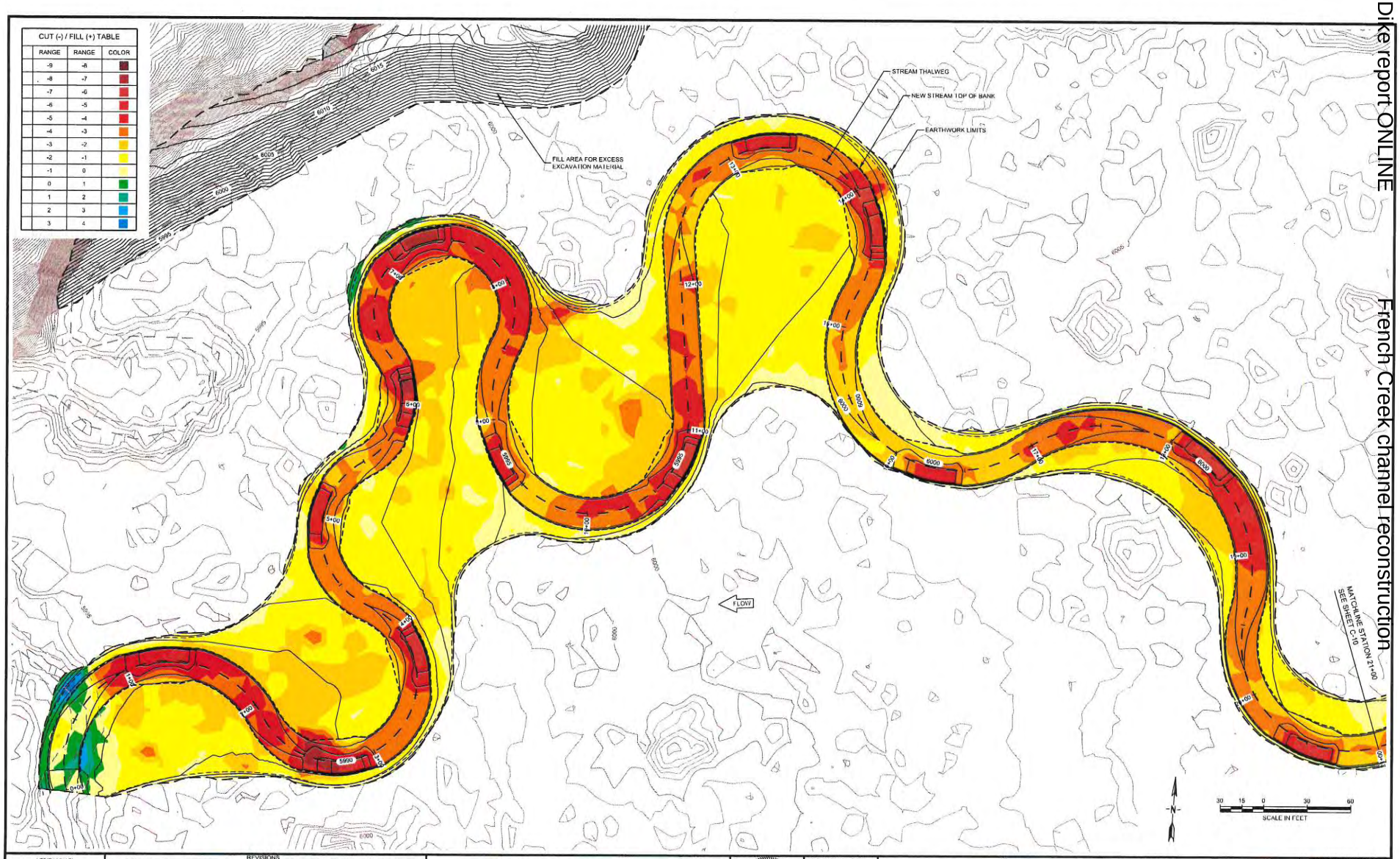
Q.C. REVIEW BY:	MTB
DATE:	04/2019

FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA
CROSS SECTIONS STA. 29+00 TO STA. 39+50

PROJECT NUMBER 5406.004.01
SHEET NUMBER -
DRAWING NUMBER C-8



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NO.	DESCRIPTION	BY	DATE

R:\5406-BHWD\5406\01\ACAD\SHEETS\11 CUT AND FILL MAP STA. 0+00 TO STA. 24+00.DWG PLOTTED BY: ZACHARIAH CAMPBELL ON Apr/05/2019

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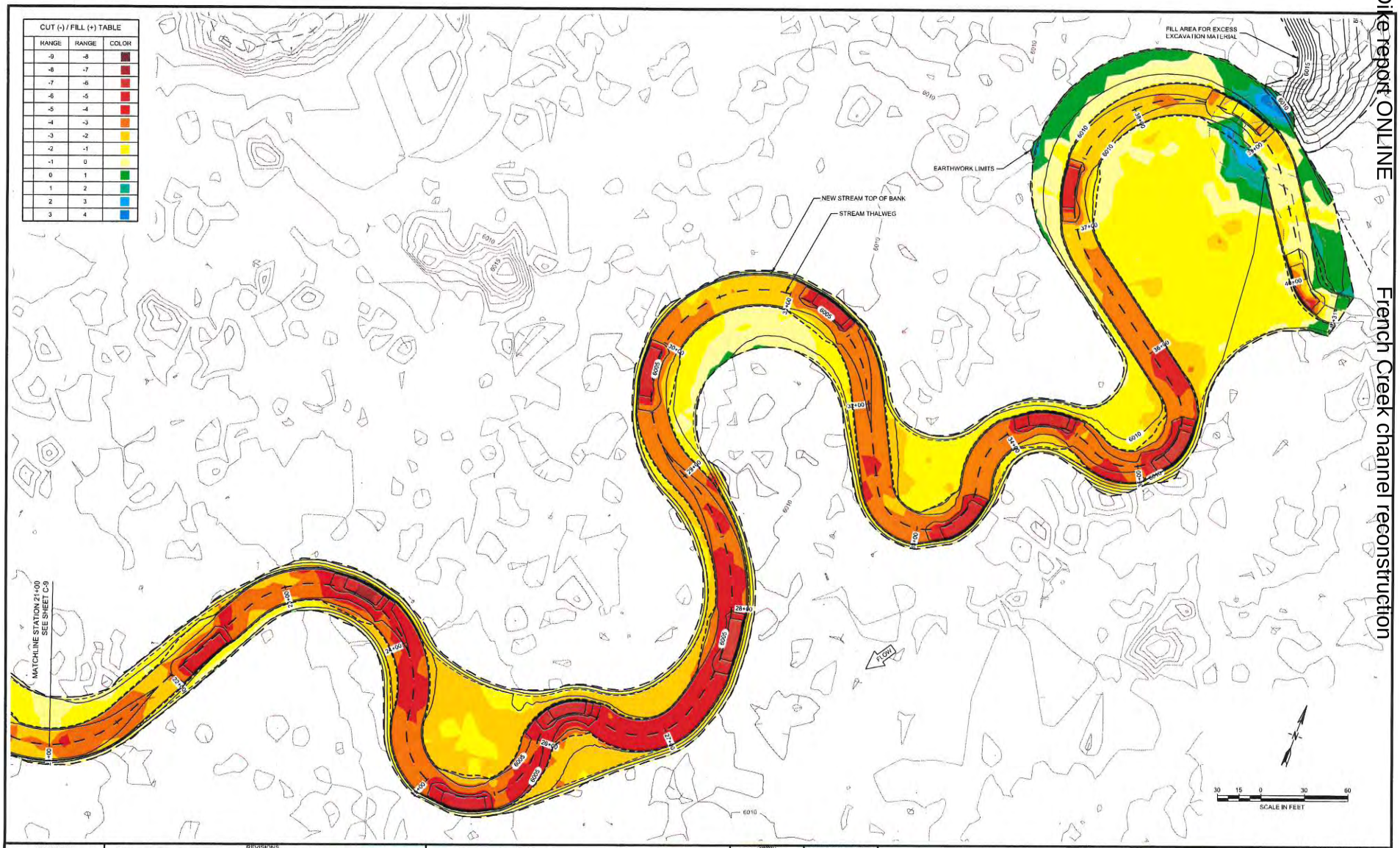
DATE	04/2019

FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA

CUT AND FILL MAP
STA. 0+00 TO STA. 12+00 AND STA. 12+00 TO 24+00

PROJECT NUMBER	5406.004.01
SHEET NUMBER	-
DRAWING NUMBER	C-9



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NO.	DESCRIPTION	BY	DATE

K:\5406-BHW\DGN\81\ACAD\SHEETS\12 CUT AND FILL MAP STA 24+00 TO STA 40+31.DWG PLOTTED BY ZACHARIAH CAMPBELL ON Apr/05/2019

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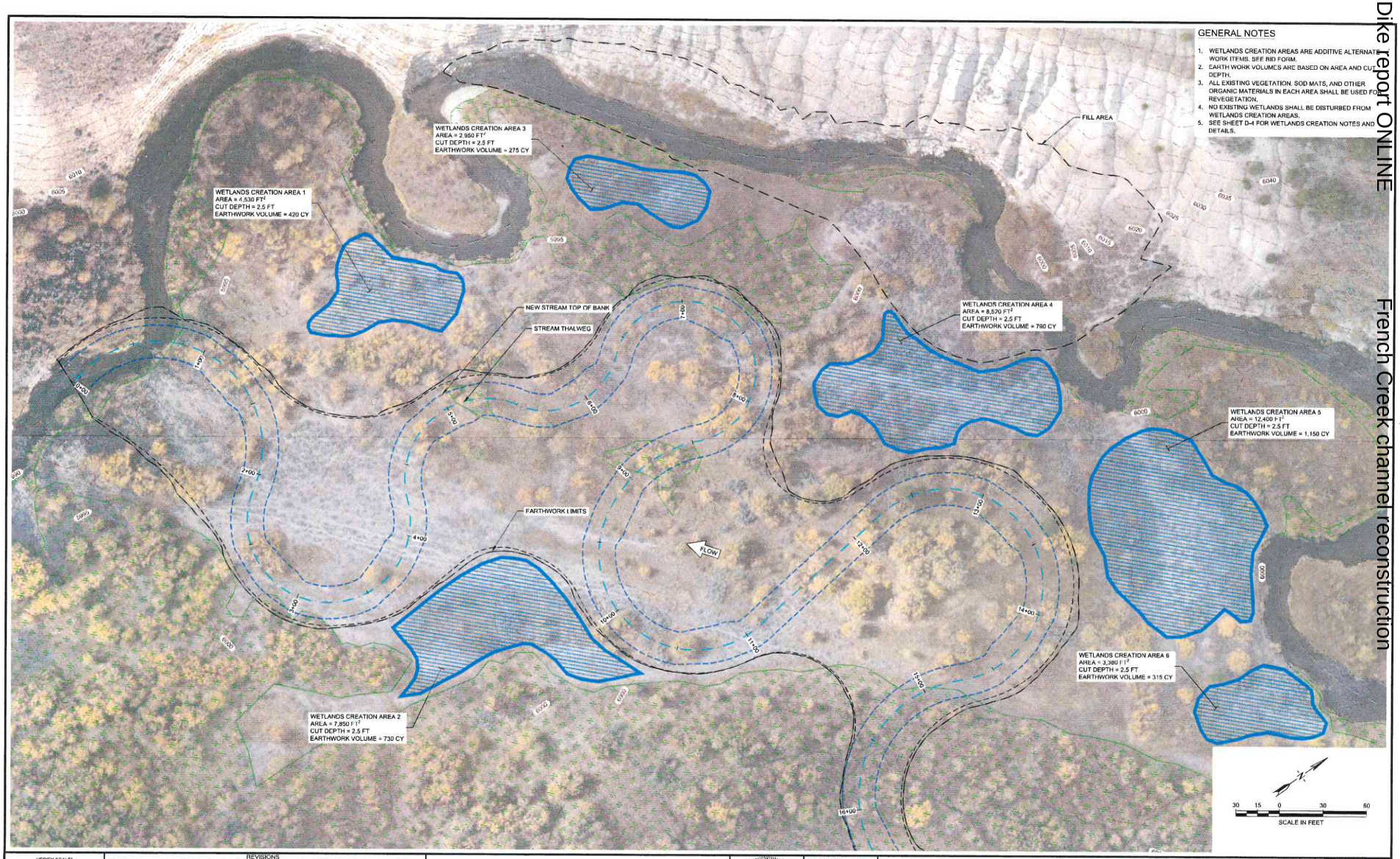
Q.C. REVIEW BY:	MTB
DATE:	04/2019

FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA
CUT AND FILL MAP
STA. 24+00 TO STA. 36+00 AND STA. 36+00 TO STA. 40+31

PROJECT NUMBER	5406.004.01
SHEET NUMBER	-
DRAWING NUMBER	C-10



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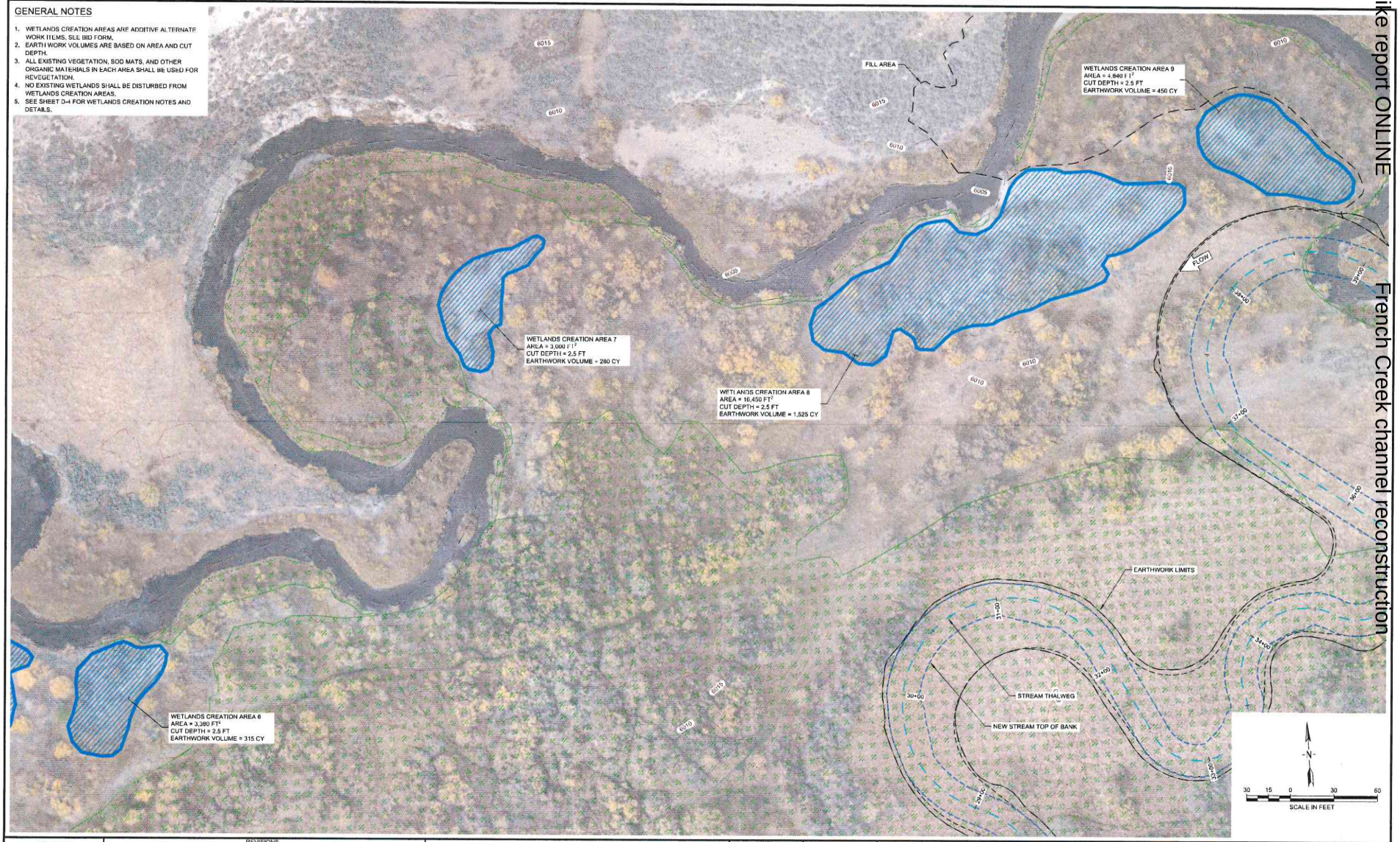
DATE	04/2019

FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA
WETLANDS PLAN

PROJECT NUMBER 5406.004.01
SHEET NUMBER -
DRAWING NUMBER C-11

GENERAL NOTES

1. WETLANDS CREATION AREAS ARE ADDITIVE ALTERNATE WORK ITEMS, SEE BID FORM.
2. EARTH WORK VOLUMES ARE BASED ON AREA AND CUT DEPTH.
3. ALL EXISTING VEGETATION, SOD MATS, AND OTHER ORGANIC MATERIALS IN EACH AREA SHALL BE USED FOR REVEGETATION.
4. NO EXISTING WETLANDS SHALL BE DISTURBED FROM WETLANDS CREATION AREAS.
5. SEE SHEET D-4 FOR WETLANDS CREATION NOTES AND DETAILS.



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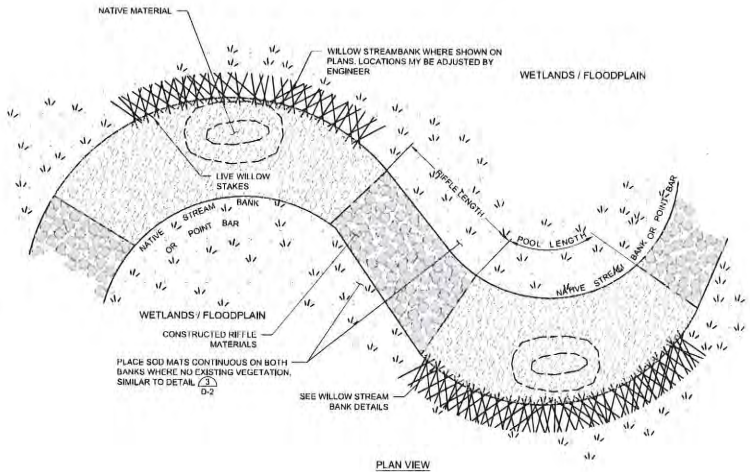
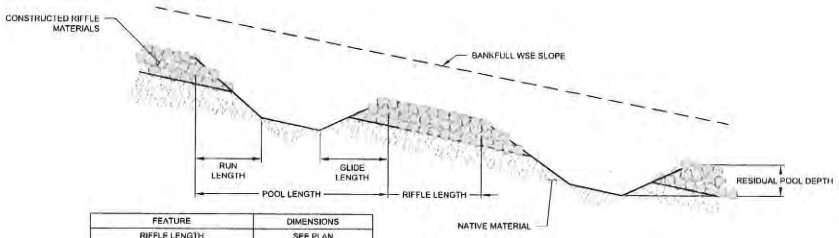
APPR. BY	MDB
DATE	04/2019
Q.C. REVIEW BY	MIB
DATE	04/2019

FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA
WETLANDS PLAN

PROJECT NUMBER	5406.004.01
SHEET NUMBER	-
DRAWING NUMBER	C-12



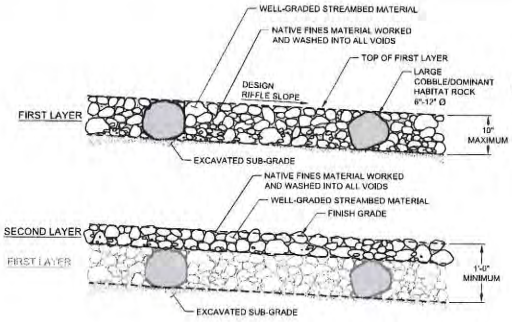
PLAN VIEW



PROFILE VIEW

FEATURE	DIMENSIONS
RIFFLE LENGTH	SEE PLAN
POOL LENGTH	50' ±5'
RUN LENGTH	10' ±5'
GLIDE LENGTH	20' ±5'
RESIDUAL POOL DEPTH	2' ±0.5'

POOL/RIFFLE SEQUENCE DETAIL 1
SCALE: NONE
C-2, C-3, C-4, C-5



CONSTRUCTED RIFFLE MATERIAL:

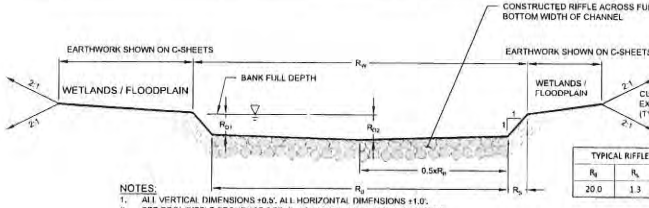
% PASSING	SIZE (INCHES)
D_{15} 10-15	0.5-2
D_{50} 40-60	2-4
D_{85} 85-100	4-6

1. APPROVED ALLUVIUM FOR STREAMBED AND BANK CONSTRUCTION SHALL HAVE MINIMUM 10% FINES. DETERMINATION SHALL BE MADE BY ENGINEER.

SEQUENCE NOTES:

1. ENGINEER SHALL DETERMINE LOCATIONS FOR CONSTRUCTED RIFFLES BASED ON OBSERVED EXCAVATION MATERIALS.
2. EXCAVATE AND SHAPE EXISTING SUB-GRADE TO PROVIDE CONSISTENT SURFACE A MINIMUM 1'-0" BELOW FINISH RIFFLE ELEVATIONS.
3. STOCK PILE ALL EXCAVATED MATERIAL. ROCKS THAT MEET WELL-GRADED STREAMBED MATERIAL GRADATION AND REMAINING FINES SHALL BE SEPARATED FOR USE IN RIFFLE.
4. PLACE DOMINANT HABITAT ROCK THROUGHOUT RIFFLE, APPROXIMATELY TEN PER 50 LF, AS DIRECTED BY ENGINEER.
5. PLACE FIRST LAYER OF MATERIAL TO PROVIDE A SOLID, WELL-GRADED, AND CONSISTENT SURFACE.
6. WORK AND WASH NATIVE FINES (GENERALLY <D_{15}) INTO ALL VOID SPACES, TO TOP OF LAYER.
7. REPEAT PROCESS FOR REMAINING LAYERS.

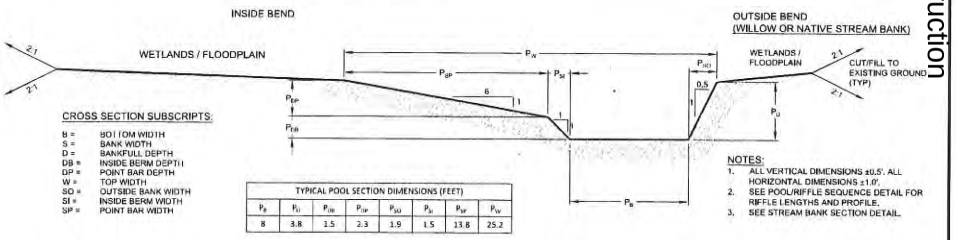
CONSTRUCTED RIFFLE DETAIL 2
SCALE: NONE
C-2, C-3, C-4, C-5



TYPICAL RIFFLE SECTION DIMENSIONS (FEET)					
R_B	R_S	R_{D1}	R_{D2}	R_W
20.0	1.3	1.3	1.8	22.6

NOTES:
1. ALL VERTICAL DIMENSIONS ±0.5'. ALL HORIZONTAL DIMENSIONS ±1.0'.
2. SEE POOL/RIFFLE SEQUENCE DETAIL FOR RIFFLE LENGTHS AND PROFILE.
3. SEE STREAM BANK SECTION DETAIL.

TYPICAL RIFFLE CROSS SECTION DETAIL 3
SCALE: NONE
C-2, C-3, C-4, C-5



CROSS SECTION SUBSCRIPTS:

B = BOTTOM WIDTH
S = BANK WIDTH
D = BANKFULL DEPTH
DB = INSIDE BERM DEPTH
DP = POINT BAR DEPTH
W = TOP WIDTH
SO = OUTSIDE BANK WIDTH
SI = INSIDE BERM WIDTH
SP = POINT BAR WIDTH

TYPICAL POOL SECTION DIMENSIONS (FEET)							
P_B	P_D	P_{DB}	P_{DP}	P_{WI}	P_S	P_W	P_{WO}
8	3.8	1.5	2.3	1.9	1.5	13.8	25.2

NOTES:
1. ALL VERTICAL DIMENSIONS ±0.5'. ALL HORIZONTAL DIMENSIONS ±1.0'.
2. SEE POOL/RIFFLE SEQUENCE DETAIL FOR RIFFLE LENGTHS AND PROFILE.
3. SEE STREAM BANK SECTION DETAIL.

TYPICAL POOL/POINT BAR CROSS SECTION DETAIL 4
SCALE: NONE
C-2, C-3, C-4, C-5

VERIFY SCALE!
THESE PRINTS MAY BE REDUCED. LINE BELOW MEASURES ONE INCH ON ORIGINAL DRAWING.
MODIFY SCALE ACCORDINGLY!

REVISIONS

NO.	DESCRIPTION	BY	DATE

R:\5406-BRWC\00401\ACAD\SHEETS\SECTIONS AND DETAILS.DWG PLOTTED BY:ZACHARIAH CAMPBELL ON Apr-05-2019

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MATTHEW P. BARNES
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LICENSED PROFESSIONAL ENGINEER

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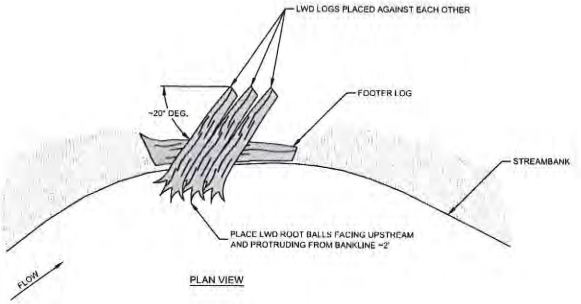
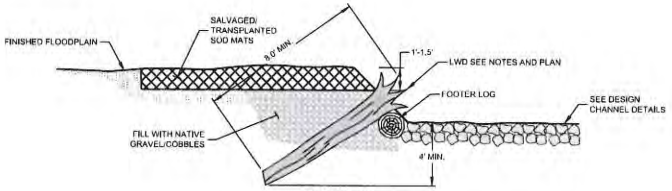
DSGN. BY	MDB
APPR. BY	MDB
DATE	04/2019
Q.C. REVIEW BY	MTB
DATE	04/2019

FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA
CHANNEL TYPICAL SECTIONS AND DETAILS

PROJECT NUMBER 5406.004.01
SHEET NUMBER -
DRAWING NUMBER D-1



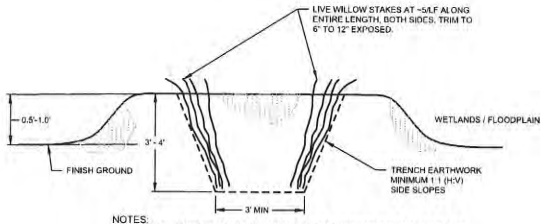
PLAN VIEW



SECTION VIEW

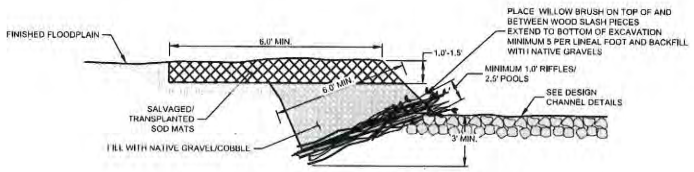
NOTES:
1. LWD: EACH LOG SHALL BE MINIMUM 8' LONG, HAVE AVERAGE MID-STEM DIAMETER OF 1.0', AND HAVE A ROOT BALL FAN ATTACHED WITH ±2.0' DIAMETER. BROKEN-END LOGS MAY BE USED IF APPROVED BY ENGINEER. CONIFER WOOD IS PREFERRED THAT IS SOUND AND WITHOUT ROTTING, CRACKS, OR OTHER STRUCTURAL FLAWS. ALL LOGS SHALL HAVE LIMBS REMOVED ABOVE THE ROOTWAD.
2. FOOTER LOG: EACH LOG SHALL BE MINIMUM 8' LONG, HAVE AVERAGE DIAMETER OF 1.0', NO ROOT BALL, AND SIMILAR QUALITY OF LWD.
3. STRUCTURES SHALL HAVE 3 LWD LOGS AND ONE FOOTER LOG EACH.
4. SOD MATS SHALL BE CONTINUOUS AND BE OVERLAPPED WITH DOWNSTREAM EDGE ON TOP OF THE NEXT SOD MAT EDGE (SHINGLED). THE UPSTREAM ENDS OF THE TREATMENT WILL BE KEYED INTO THE SUBSTRATE.

WOOD HABITAT STRUCTURE DETAIL (1)
SCALE: NONE
C-2, C-3, C-4, C-5



NOTES:
1. FINAL LOCATIONS WILL BE DIRECTED IN FIELD BY ENGINEER, GENERALLY WILL BE PERPENDICULAR TO STREAM AND OR VALLEY SLOPE AND ALONG CONTOUR TO MIMIC NATURAL FEATURES & TOPOGRAPHY.

FLOODPLAIN WILLOW ROW DETAIL (2)
SCALE: NONE
C-2, C-3, C-4, C-5



NOTES:
1. CREATE TOE PROTECTION WHERE SHOWN WITH MATRIX OF WOODY STEMS/LIVE WILLOWS/BRANCHES WITH MAXIMUM 6-INCH DIAMETER STEM, MINIMUM LENGTH AS SPECIFIED, AND INTER-WOVEN TO CREATE A CONTINUOUS MAT. BACKFILL AND MECHANICALLY WORK NATIVE GRAVEL/COBBLE MIX OF WELL GRADED SUBSTRATE TO CREATE A COMPACTED LIFT WITH MAXIMUM THICKNESS OF 6-INCHES UNTIL THE MINIMUM SPECIFIED DEPTH IS MET.
2. BANK SLOPE VARIES 0.5-1.0:1 (H:V).
3. SOD MATS SHALL BE CONTINUOUS AND BE OVERLAPPED WITH DOWNSTREAM EDGE ON TOP OF THE NEXT SOD MAT EDGE (SHINGLED). THE UPSTREAM ENDS OF THE TREATMENT WILL BE KEYED INTO SUBSTRATE.

WILLOW STREAM BANK DETAIL (3)
SCALE: NONE
C-2, C-3, C-4, C-5

VERIFY SCALE!
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MODIFY SCALE ACCORDINGLY!

REVISIONS			
NO.	DESCRIPTION	BY	DATE

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APP'D. BY	MDB
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Q.C. REVIEW BY	MTD
DATE	04/2019

FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA
CHANNEL STABILIZATION STRUCTURE DETAILS

PROJECT NUMBER 5406.004.01
SHEET NUMBER -
DRAWING NUMBER D-2

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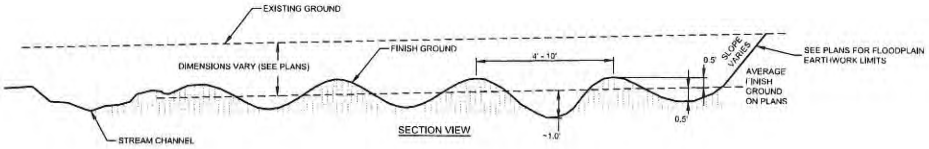
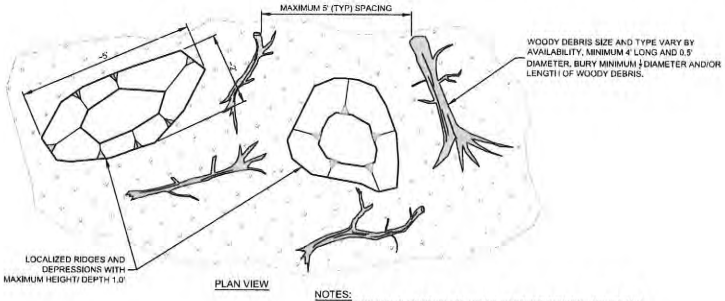


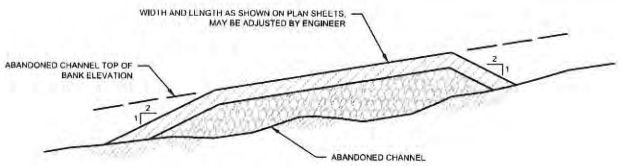
SECTION VIEW



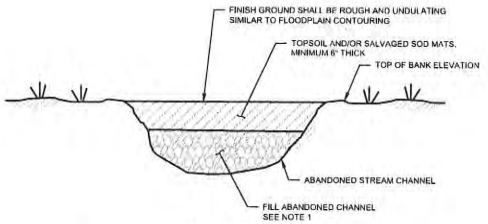
PLAN VIEW

NOTES:
1. SECTION AND PLAN VIEWS ARE MEANT TO DEPICT GENERAL NATURE AND COMPLEXITY OF FLOODPLAIN ROUGHNESS AND CONTOURING. SEE DESIGN PLANS FOR ACTUAL EARTHWORK CUT AND FILL INFORMATION. FLOODPLAIN FINISHED SURFACE IS MEANT TO PREVENT CONCENTRATED FLOWS AND ENCOURAGE COMPLEX, DISPERSED FLOW AND FLOOD DETENTION.
2. MICRO TOPOGRAPHY SHALL BE IRREGULAR IN DIRECTION, SPACING AND MAGNITUDE TO PRODUCE NATURAL APPEARING LAND FEATURES AND TOPOGRAPHY. FINISH GROUND SHALL BE DE-COMPRESSED BEFORE SEEDING AND WOODY DEBRIS PLACEMENT.
3. DEPTH TO MATCH ADJACENT BASE FLOW ELEVATION. COORDINATE WITH ENGINEER PRIOR TO EXCAVATION OF DEPRESSION.

FLOODPLAIN CONTOURING DETAIL (1)
SCALE: NONE
C-2, C-3, C-4, C-5



PROFILE VIEW



SECTION VIEW

NOTES:
1. USE GRANULAR MATERIAL FROM EXCAVATIONS TO FILL EXISTING CHANNEL. COMPACT UNTIL NO VISIBLE DEFORMATION OCCURS.
2. CONTOUR AND FINISH GRADE TO PROVIDE UNDULATIONS UP TO ±0.5' AND PREVENT FLOW LINES PARALLEL TO VALLEY SLOPE.
3. PRESERVE EXISTING VEGETATION ADJACENT TO CHANNEL PLUGS.

ABANDONED CHANNEL PLUG DETAIL (2)
SCALE: NONE
C-2, C-5

VERIFY SCALE!
THESE PRINTS MAY BE REDUCED. LINE BELOW MEASURES ONE INCH ON ORIGINAL DRAWING.
MODIFY SCALE ACCORDINGLY!

REVISIONS			
NO.	DESCRIPTION	BY	DATE

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APVD. BY	MDB
DATE	04/2019
Q.C. REVIEW BY	MTB
DATE	04/2019

FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA
FLOODPLAIN AND ABANDONED CHANNEL DETAILS

PROJECT NUMBER 5406.004.01
SHEET NUMBER -
DRAWING NUMBER D-3

PLANTING SPECIFICATIONS PER ZONE

EMERGENT WETLANDS (FLOODPLAIN) ZONES

EMERGENT WETLAND TREATMENTS SHALL INCLUDE SOD MAT TRANSPLANTS FROM AREAS OF STREAM CONSTRUCTION THROUGH EXISTING WETLANDS AND MATURE WILLOW TRANSPLANTS. THESE DETAILS AND NOTES APPLY TO BOTH WETLANDS WITHIN THE EARTHWORK FOR STREAM CONSTRUCTION SHOWN ON SHEETS C-2 TO C-5 AND THE CREATION WETLANDS AREAS SHOWN ON THE WETLANDS PLAN SHEETS C-11 TO C-13.

1. *CREATION EMERGENT WETLANDS*
THESE WETLANDS ARE CREATED FROM UPLAND (NONWETLAND) AREAS BY EXCAVATING ACCORDING TO THE CUT AND FILL MAP (C-9 & C-10). THESE CREATED EMERGENT WETLANDS SHALL BE VEGETATED USING ONE OF THE FOLLOWING METHODS:
   A). 50% WETLAND SOD: (SEEDING BY OWNER)
   - CHECKERBOARD

   B). 100% SOD MATS: THE ENTIRE CREATED WETLAND WILL BE REVEGETATED USING SOD MATS AS PREVIOUSLY REFERENCED.

TRANSPLANTED MATERIALS

MATURE WILLOWS:
1. MATURE WILLOWS WITHIN THE PROJECT AREA SHALL BE TRANSPLANTED TO PROVIDE LARGE STATURE PLANTS WITH ESTABLISHED ROOT SYSTEMS.
2. WILLOW TRANSPLANTS SHALL BE PLANTED THROUGHOUT THE PROJECT.
3. THE MATURE WILLOWS SHALL BE EXCAVATED FROM THERE EXISTING LOCATIONS AND PLACED DIRECTLY IN TRANSPLANT HOLES.

WETLAND SOD MATS
EMERGENT WETLAND SOD MATS PRIMARILY COMPRISED OF SEDGE SPECIES WILL BE USED TO PROVIDE ESTABLISHED ROOTED VEGETATION WITHIN EMERGENT WETLANDS AND ALONG STREAMBANKS.

1. SOD SALVAGE:
   A). NO SOD SALVAGE OUTSIDE THE PROJECT FOOTPRINT IS ANTICIPATED.
   B). SEE DETAIL 3/D-4 FOR SOD SALVAGE IF NEEDED.

WILLOW COLLECTION / PLANTING

WILLOW POLE AND BRUSH COLLECTION METHODS:
1. COLLECT WILLOW STEMS DURING DORMANT SEASON PRIOR (PREFERABLE) TO BUD BREAK (MARCH-APRIL) OR AFTER LEAF FALL ONCE PLANT IS DORMANT AND PLANT AS SOON AS POSSIBLE.

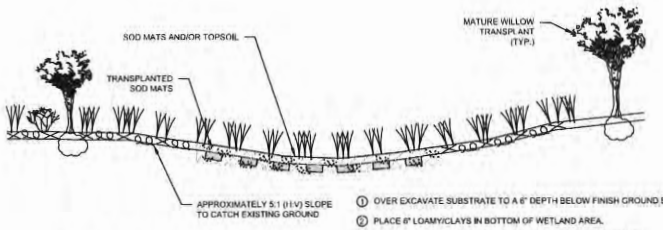
2. TRIMMING METHODS:
WETLANDS/FLOODPLAIN: REMOVE ALL LATERAL SIDE BRANCHES FROM THE STEMS WITH HAND PRUNERS.
STREAMBANK: DO NOT REMOVE SIDE BRANCHES.

3. HARVESTING:
SEE SPECIFICATIONS FOR HARVESTING AND STORAGE REQUIREMENTS.

4. INSTALL WILLOW POLES ALONG ALL STREAMBANKS JUST ABOVE TOP OF BANK LOCATED EITHER SATURATED SOIL DURING LOW WATER OR IN CONTACT WITH GROUNDWATER DURING THE GROWING SEASON.

5. SPACING:
   A). TYPICAL SPACING FOR WILLOW POLES WILL BE APPROXIMATELY 5-10 FEET THROUGHOUT THE WETLANDS/FLOODPLAIN. 2/D-4

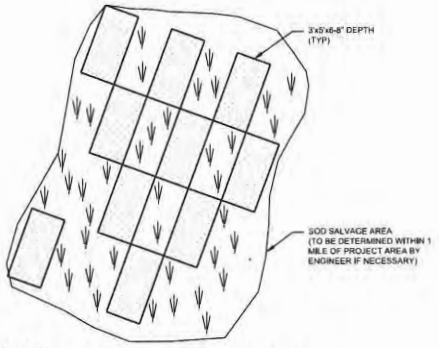
   B). SPACING FOR WILLOW BRUSH ON STREAMBANKS SEE DETAIL. 3/D-2



① OVER EXCAVATE SUBSTRATE TO A 6" DEPTH BELOW FINISH GROUND ELEVATION.
② PLACE 6" LOAMY/CLAYS IN BOTTOM OF WETLAND AREA.
③ TRANSPLANT WETLAND SOD MATS IN CHECKERBOARD FASHION.

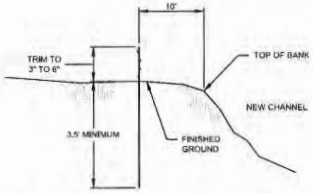
EMERGENT WETLANDS DETAIL 1
SCALE: NONE
C-11, C-12, C-13

UPLAND RESTORATION NOTES:
1. UPLAND AREAS THAT HAVE BEEN DISTURBED AS A RESULT OF CONSTRUCTION WILL REQUIRE RESTORATION. SEE SPECIFICATIONS.



NOTES:
1. A SOD SALVAGE SITE IS NOT ANTICIPATED, A SITE AREA WILL BE DETERMINED NEAR THE PROJECT IF REQUIRED.
2. STRIP SOD FROM THE SALVAGE SITE IN A CHECKERBOARD FASHION (APPROX. 5 FEET LONG, 3 FEET WIDE, 6 TO 8-INCH DEPTH).
3. DO NOT REMOVE MORE THAN 50% OF THE SOD FROM A SALVAGE SITE.

SOD SALVAGE AND RESTORATION - PLAN VIEW 3
SCALE: NONE
C-11, C-12, C-13



NOTES:
1. INSTALLATION LENGTH = 3 FEET MINIMUM.
2. DIAMETER - ½ TO 1 INCH WITH DIBBLE BAR OR STINGER. CREATE 3-FT DEEP HOLE. BOTTOM OF HOLE SHOULD BE MINIMUM 6 INCHES BELOW GROUNDWATER TABLE.

WILLOW POLE PLANTING CROSS SECTION 2
SCALE: NONE
C-11, C-12, C-13

VERIFY SCALE!
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MODIFY SCALE ACCORDINGLY!

REVISIONS

NO.	DESCRIPTION	BY	DATE

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DATE	04/2019
Q.C. REVIEW BY	MTD
DATE	04/2019

FRENCH CREEK STREAM RESTORATION
DEER LODGE COUNTY MONTANA
FLOODPLAIN AND WETLAND TYPICAL SECTIONS AND DETAILS

PROJECT NUMBER 5406.004.01
SHEET NUMBER -
DRAWING NUMBER D-4